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Safety Boilers.

THE present tendency in the employment of steam as a motive power, is unquestionably towards the use of high pressures, and also towards the employment of easily transportable and large boilers. Much time and skill have been spent in endeavoring to reconcile these apparently contradictory requirements. In our mountainous mining regions where freights are always high and where it is sometimes impossible to transport large, heavy boilers the want of such a one as we herewith illustrate was long felt, and since their invention and introduction they have been largely employed and, we believe, with very general satisfaction.

The reason for the economy of the employment of high steam is, we presume, well known to most of our readers, but for the benefit of those who have not paid special attention to the subject, we may mention that it has been demonstrated by eminent scientists that after water has reached a temperature of 212° Fahr., or commenced to boil, five and a half times as much heat is necessary to convert it into steam as was necessary to raise it from the freezing to the boiling-point. This is usually expressed by saying that 990 heat-units are necessary to convert a pound of boiling water into steam. A well-constructed high-pressure engine can only convert into motion the excess of the power or tension that the steam possesses, when it is introduced into the cylinder of the engine, over its tension at a temperature of 212°. This force is represented by the heat which is imparted to the steam after its generation, and is the only portion of the heat, generated by the consumption of the fuel, which is actually converted into motion by the engine. But, as we have seen, a very large amount of fuel is expended in merely bringing the water into such a condition that heat, which can be recovered again in useful work, may be imparted to it. We exclude, of course, in this connection a comparatively small loss in friction. In a high-pressure engine, the heat consumed in simply generating the steam, that is, the heat necessary to convert the feed-water into steam of 212° temperature, is almost irrevocably lost; and hence to economize by the use of such an engine, we must endeavor to make the proportion between the fuel consumed in simply bringing the water into a proper condition to receive useful heat, and that which is imparted to the prepared steam, and which is afterward converted into motion, as favorable as possible. As we have said, the pressure and the temperature of steam bear a direct relation to each other. If we could heat steam to a given temperature in a vessel from which there was no radiation, and allow it to expand, the temperature would be lowered. In the cylinder of a high-pressure steam-engine, the steam in expanding exerts its force on the piston; but, as it leaves the cylinder in the form of steam, it is of course impossible to reduce its temperature below 212°, though all the heat or tension which it possesses above this may be utilized.

Practically, however, limits are placed upon the tension to be employed by considerations of the safety of life and limb; or, in other words, the limit is drawn by the capacity of the boiler to resist the pressure. When a large shell-boiler is employed, the pressure which can be safely carried is comparatively small, and the extremely disastrous results which so frequently accompany explosions of such boilers, have further lowered the public confidence in them.

Among the first boilers, introduced with the view of obviating the danger arising from the use of the old-fashioned shell-boilers, was the one which we here illustrate. The safety which it secures, the ease with which it may be transported, erected, or removed, its economy, and the general excellence of the workmanship upon it, have caused it to be extensively adopted. As will be seen in our engraving, Fig. 1, the water is contained in tubes placed in a slanting position over the fire, and constructed of the best quality of wrought-iron. From Figs. 1 and 2 together, it will be seen that the tubes are connected by a very simple and ingenious arrangement consisting of triangular castings, forming three-way bends, and held in place by clamps and bolts. Upon the ends of each tube are screwed hollow cast-iron heads, each containing three circular recesses, in which are inserted vulcanized rubber rings, and upon these the three-way bends before mentioned are secured. In case of an accident to one of the tubes, it may be easily removed in a few minutes, and a new one inserted; or in case an extra tube is not at hand, the tube may be removed and the circular openings in adjoining heads, which connect with it, closed by blanks, and the boiler continued in operation till a new tube is obtained. Fig. 2 also gives an idea of the general appearance of the boiler when set.

In case an increase of boiler capacity is desired, new tubes can be added on the sides and top, and the furnace enlarged by removing only the brick work on the top and on one side.

The communications between the tubes is made large enough to counteract the tendency of the steam to carry water with it and leave a tube partially empty, when a sudden demand for steam is made. In Figs. 1 and 2 the positions of the steam-drum, from which the steam is taken to supply the engine, and also that of the safety-valve, are shown. Fig. 3 is a perspective view of the tubes placed in position, but not set in brick-work. Fig. 4 shows the manner of setting together the iron frame which accompanies each boiler. The relative heights of the standards are so proportioned that when the frame is placed on level brick-work, and the tubes are set upon the cross-pieces intended for their support, they will make the proper angle, about 18°, with the horizontal. The plate *y* is intended to form a base for a wrought-iron smoke-stack, and is provided with a damper. The iron frame serves, of course, to hold the brick-work firmly together, and at the same time is a valuable guide for the mason. Any intelligent workman can set such a boiler, without ever having seen one, from the drawings and by the aid of the framework just mentioned. The tubes are tested before leaving the shop, up to a pressure of five hundred pounds to the square inch. The boiler may be taken to pieces for transportation, so that no part is too heavy to be carried, if necessary, in mountainous mining regions, upon the back of a mule. There is no doubt that in such a boiler a much higher pressure may be safely carried than in an old-fashioned one. Even if a tube should burst, it could cause but little damage, and the break would immediately act as an open safety-valve for the rest of the boiler.

We are informed by the manufacturers of this boiler, that in some cases, through accident or carelessness, some of the tubes have become entirely emptied of water and heated red hot, and that while in this condition they have been again pumped full of water without drawing the fire, and without any accident whatever occurring. They also state, that in ordinary practice they are able to evaporate from eight to ten pounds of water with one pound of coal, which is certainly very high economy, and well worthy the serious consideration of all who are desirous of having a cheap, safe, reliable, and economical steam-boiler. Pamphlets and circulars, containing price-list and other information about this boiler, may be had upon application to the manufacturers, the Root Steam-Engine Co., Second avenue, corner of Twenty-eighth street, N. Y. city.

Fig. 1.
SECTIONAL ELEVATION.

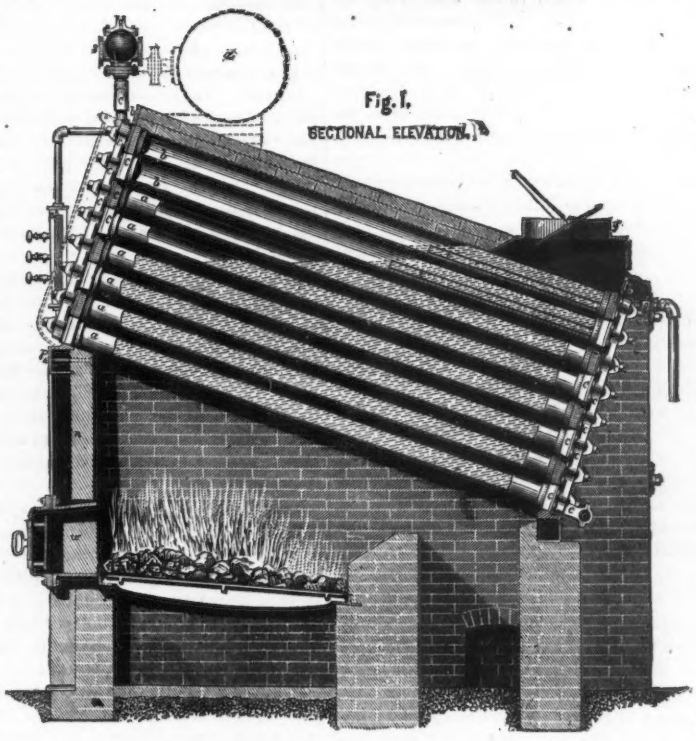


Fig. 2.

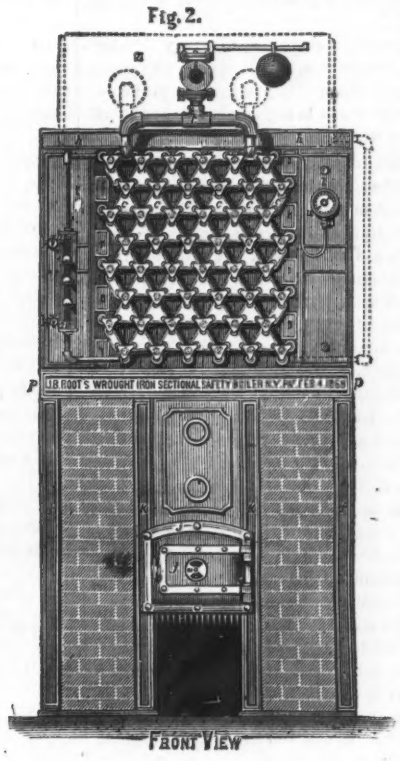


Fig. 3.

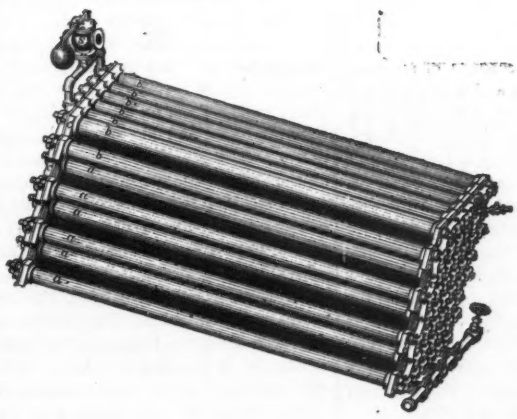
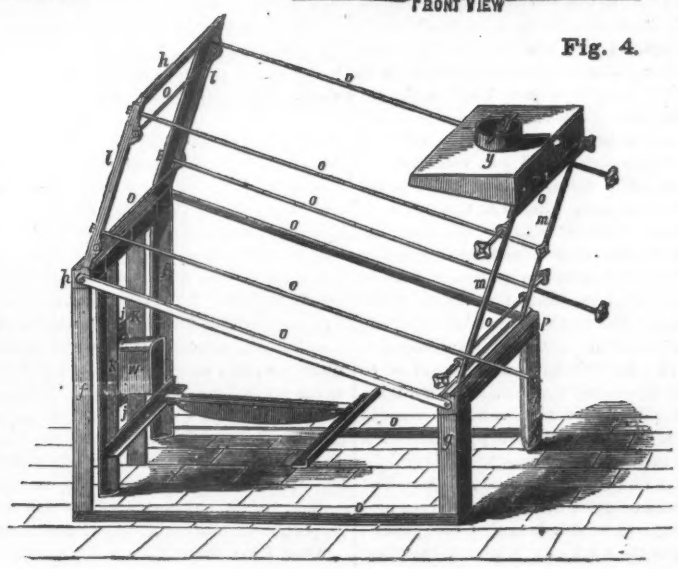


Fig. 4.



Polytechnic Club of the American Institute.

Meeting held at the rooms of the Association, March 30, 1871. The President (Prof. S. D. TILLMAN) in the chair.

MR. ROBERT WEIR (the Secretary) read the following paper On Submarine Warfare.

The monitor type of war-vessel has been proved the most formidable, and as far as invulnerability is concerned, the most perfect of naval craft for the purposes intended; namely, to give and receive blows above or near the surface of the water. They present the least surface of exposure to the shot or ram of an enemy, and that surface being small is most readily protected with armor of almost any required thickness. These very important facts were practically demonstrated during our late war, and since the close of that eventful strife other nations are adopting the system. In England and France they tried to adopt the monitor with the broadside system, with an apparent intention to avoid anything that should be purely American in their plans, and the result has been an enormous expenditure of money with no adequate returns. And but lately a sad casualty happened to one of this nondescript class of war vessels. A heavy lurch in an ordinary storm at sea, and the top-heavy craft went down, carrying with her her crew of about 500 souls. (Early on the morning of the 7th of September, 1870, H. M. S. Captain foundered off Cape Finisterre with almost all hands on board, only eighteen men having been saved out of her crew of upwards of 500 souls.)

With our monitors our heavy guns will also be imitated, and we must prove ourselves equal to the emergency. Resting satisfied with our success above water, we may turn our attention to operations below the surface; here is the vulnerable spot, the heel of Achilles, which has been left undipt, that the remaining part of the body might be certainly made impregnable.

During the past eight years there has been many developments made in this important arm, and it is now universally adopted as a necessity both for military and naval purposes; regularly organized torpedo corps being employed by the different great nations of the world.

Our own Government has adopted systems, part of which are known to the general public; but the latest performance of the corps are enveloped in that mistaken secrecy, which the zeal of an enemy has but little trouble in ferreting out. We have adopted one system which has worked well in experiment, and which will in actual practice prove very effective. This is the torpedo craft designed and built by Engineers WOOD and LAY of our navy, a description of which may prove interesting. We will take the first one of this class, which was built and known as the "Spuyten Duyvil." Her length is eigthy-four feet, breadth twenty-one feet, depth of hold ten feet. The torpedo machinery weighs about ten tons, while her propelling machinery weighs about two and a half or three tons; her deck is something like a monitor's, having smokestack, ventilators and pilot house visible. Her armor is about five inches in thickness. In the bow is an air and water-tight chamber, which can be opened and closed by a valve worked by gearing. The valve and gearing are contained in a water-tight casing connecting with the interior of the chamber. An operating-bar made of boiler iron is arranged to run out and in through this chamber by a universal stiffening box joint, as it may be termed, which allows the bar to be pointed in different directions. The rear end of the bar is connected with a chain to a drum near the water-tight compartment, while the forward bend connects with a chain to a drum in the compartment; by means of these chains the bar is run out and in as desired. On the end of the bar is a case to receive the torpedo shell, the case being in the water-tight chamber, which has the water previously pumped out of it. The torpedo is placed within it, and pushed back so as to be clasped by jaws which are on the end of an inside rod to the bar. The chamber is closed and the operating bar is now ready to run out. As you are now near the enemy, the propeller is stopped and reversed, the driving machinery is started, the drums revolve and run out the operating bar. When it is fully extended, the action of the drums is simultaneously reversed, and the operating bar quickly run back into the vessel. So soon as the bar begins to travel back, the rear end of the inside rod comes in contact with a trip, which stops its progress, while the motion of the bar continues. This check to the inside rod causes the torpedo to be pushed out and released from the casing, being only connected thereto with a cord. Its buoyancy now causes it to rise against the bottom of the enemy's vessel. The cord being now distended from the backward motion of the torpedo craft and machinery of the bar, it releases a pin which has sustained a weight in the inside of the torpedo. This weight falls upon a percussion cap and the explosion is made. The torpedo is a special feature in itself; the shell is divided into two chambers by a yielding wad or diaphragm of wire gauze; the larger chamber contains the explosive material, the other is merely an air space to give direction to the explosion. A tube is placed in the centre of the shell, in one end of which an iron ball or weight is held in position by a pin, which, when withdrawn, allows the weight to fall upon a percussion cap placed on a nipple at the opposite end of the tube. A cord is fastened to the releasing pin and coiled in a recess of the case which holds the torpedo.

The Rebel iron-clad Albermarle was destroyed by the use of one of these torpedoes, projected from an ordinary steam launch. On the night of the 27th of October, 1864, Lieut. Cushing came within 100 yards of the ram before he was discovered and hailed. He then had to describe a semi-circle with his little craft in order to strike the Albemarle fairly. He drove at her under a full head of steam, striking and pressing in the fender of logs which surrounded the ram, and at the same moment ran out the spar and placed the torpedo under the enemy's quarter. It could have been scarcely six feet beneath the surface of the water. At this instant a gun was fired from the ram, and the intrepid Cushing pulled the cord and exploded the torpedo. In a moment his little craft was swamped and he and his brave companions left in the water to perish or save themselves as best they might.

Our Government has made many important improvements upon these first inventions, by which their operation is greatly simplified and rendered more perfect in its effects, without the slightest risk to the operating vessel. A number of torpedoes can be projected from the craft as she passes the enemy's ships, and this can be done without arresting the speed or changing the course of the torpedo-boat, as readily and as accurately as though firing a broadside of guns.

The English have adopted a torpedo known as the "Otter," and invented by JOHN HARVEY of the Royal Navy. This is a wooden case strengthened with iron, and containing the shell or torpedo within it. It is about ten feet long, seven feet deep and two feet wide. A cable is attached to this in such a manner, that when towed from a vessel it can be made to diverge from her course at any angle under 45°. To compel this machine to hug the side of an enemy will require a great excess of speed in the assailing vessel, and would be very clumsy to manage under any circumstances, though England prides herself on now possessing a machine which is very sailor-like in its action, and therefore well suited to the use of seamen. This torpedo is operated either from the torpedo craft by lines reaching it for that purpose, or by electricity or contact with the enemy. Russia, being alive to all improvements, has accepted this system, though it is generally understood that she has a better, and one similar to the "Austrian torpedo." This is propelled by compressed air working propellers; its depth in the water is regulated by a horizontal rudder worked by hydraulic pressure; the water acting upon a diaphragm of India-rubber, which is compressed or expanded, according to the depth of immersion. This pressure is utilized so that the rudder can be set to retain a certain position for the torpedo, according to the depth the operator may wish to strike an object. The use of compressed air in this manner has its disadvantage.

Mr. JOHN ERICSSON, a man upon whom all Americans look with pride, has brought before the public numerous ideas in regard to submarine warfare which are worthy of much consideration. One of his propositions is, that the torpedo shall be driven by propellers worked through rotary engines driven by air supplied from the ship through a flexible tube which the torpedo tows out from the vessel's side as the pressure works the propellers, the torpedo to be guided by a greater or diminished allowance of air as the tube is reeled off. The life of the torpedo would depend upon the length of hollow cord, which would probably be liable to a complication of derangements. Mr. ERICSSON'S last proposition is to throw elongated shells from guns of large calibre at moderate ranges, say 1000 or 1500 feet, letting them dip into the water just before reaching the vessel to be struck, and continuing their course to come in contact and explode well below the water-line. These shells are to contain 200 lbs. or more of dynamite. This scarcely seems practicable, as we are by no means up to the emergency arising from the use of such bolts.

I now have a proposition of my own which I will respectfully place before you, a style of torpedo which I have experimented with to a limited extent, but which has proved itself quite feasible.

This torpedo is really a submarine rocket, a slow burning powder being used to supply the propelling power, while the construction may be justly characterized as plain and simple, the device being composed of only two parts, viz., the exploding shell, or torpedo proper, and the rocket, or propelling shaft. Both parts can be made of copper, zinc, sheet-steel, or thin boiler-iron. In the first place we have the torpedo, or exploding part of the projectile. This is shaped like an ordinary rifle-shell, to present a surface of least resistance to the water. The apex, when the apparatus is in use, consists of an easily ignited percussion fulminate, covered with a thin filmlike coat of copper, covering several inches of the point of the shell, so that contact with any part of the front will ignite the charge. The shell is then filled with the exploding powder through a hole in its base. Then the rocket, or shaft-projector—a hollow, tapering shaft made of thin, strong material, to be filled with slow burning powder. On the outside, and at equal distances apart, are three wings or keels, set on the same line as the axis of the projectile. The small end of the shaft has a contracted opening, through which the gas of the rocket-powder in the chamber is to act in propelling the torpedo. This shaft is loaded with a large rocket, or the rocket-powder is rammed into it, as in a rocket-case, leaving a central opening, of large surface, for the burning powder which is mixed with a greater proportion of charcoal to insure the necessary action.

When filled, the large end is securely stopped with a carefully-fitted plug or sabot of wood, and is then set into the lower rim of the shell, where it fits snugly. It can be secured in this position by screws, which join all parts together with strength. The weapon is now ready for use; and, as it must be projected from below the surface of the water, a gun or guide of sufficient strength, and of simple construction, can be secured in the vessel's side or bows eight or ten feet below the water-line, as needed. This will have an outboard and inboard, or breech-valve. To load, the outboard-valve will be closed, and the inboard opened; the torpedo will be carefully run into the chamber to a marked distance. A thick wooden sabot, with a hole turned in the centre of it, just large enough to receive the projecting tube of the shaft, is then placed against the swell and wings of the instrument, fitting snugly in the bore of the gun, and leaving a space of several inches between itself and the inboard-valve. A friction-primer is now set in the tube connecting with the slow burning powder; the wire from this runs through the inboard-valve, which is now closed, and the outboard-valve is opened, admitting the water freely around the torpedo to the sabot. The instrument is now ready for use. Possibly, it may be necessary to assist so large a body in starting. This can be done by mechanical means. After firing, which is directed from deck, the outboard-valve is closed, and the inboard-valve opened, allowing the water from the gun to run into the hold of the ship, and another torpedo can be placed in position, etc. This operation of loading and firing will consume no more time than has been occupied in its description. The torpedoes being made, and cased ready for use, are stored in the magazine like loaded shells.

Any vessel can be armed with these torpedoes, for the construction of the gun or guide is comparatively simple; the power which forces the projectile from the gun, being contained in itself, will necessitate but little trouble in handling. One of our monitors, armed with three or four of these guns on a side, could well defy the navies of the world. In numerous experiments which were made to test this principle, its success was quite apparent. The first trial was made with the shell of the torpedo constructed of light pine wood, a little over two feet in length and three inches in diameter at the centre, being turned to the shape of a spindle. This was cut away in the inside to admit of an ordinary government rocket, with lead for ballast. It was weighted so that the specific gravity was a little more than that of water, so that when it was placed in the water it would slowly settle to the bottom, retaining an almost horizontal position. The after or near part of this spindle was provided with three wings of tin, placed equidistant from each other, and in a true line with the spindle axis.

It was fired from a water-tight wooden box guide at a depth of two feet below the surface of the water, by means of a friction primer, the spindle being packed in the guide at its centre with stiff tallow in order to exclude the water from its after part. The torpedo started almost instantly from its position of rest, and travelled most satisfactorily, making a distance of sixty-three feet in five seconds, and striking the target three feet to the left of the point aimed at, and two feet ten inches below the surface of the water. This excess in depth was attributed to the lightening of the after part of the spindle by the burning away of the rocket powder, which would cause that part to lift.

Many other experiments were tried, all of which clearly demonstrated the principle. I found that in giving the wings or keels a spiral shape, in order to rotate the torpedo like a rifle shell, the tendency was to retard and lift the projectiles to the surface of the water. The best results were gained by the use of the HALE rocket principle, the rotation being caused by the direction of the propelling gases, thereby leaving a perfectly clear and smooth surface to the whole apparatus, or in having keels of thin material on the same line as the axis of the spindle.

This projectile could be used at any distance under 250 yards with great effect, being made large enough to contain 250 lbs. of composition for generating the gas for propulsion, and about 200 lbs. of explosives. A little practice with the above short range would enable an operator to hit an object without fail, and leave him free from the fear of being "hoisted with his own petard," as is so apt to be the case where close contact of the operator is required.

It will be seen that the velocity of these projectiles will depend upon their shape and sectional area, as well as the powerful action of the generated gas. They must be well and carefully proportioned, their length being not less than six times the diameter. Torpedoes, for the use of ships, could be made about 18 or 20 inches in diameter, containing from 175 to 200 lbs. of explosive powder; and, for harbor defence, they might be made 2 feet in diameter. One of this latter diameter would be 12 feet long, and, being made of scant ¼-inch boiler iron, the weight of the entire shell would not exceed 600 lbs. The displacement of water would be nearly 20 cubic feet, or 1234 lbs., leaving 634 lbs. for the explosive and propelling powders. Three hundred and forty pounds could be used for the generation of the gas, and 300 lbs. for the exploder; but, for harbor defence, nitro-glycerine could be used, and thereby reduce the size of the torpedo considerably; and by reducing the size of the shell, and lengthening the shaft proportionately, such a mixture could be used as would generate a tremendous pressure of gas for the propelling force, and, by reducing the time of travel to a minimum, insure better results. In some of the experiments which were tried, the velocity attained by this means was astonishing. The projectiles were made of tin, and about ten diameters in length, with carefully-pointed heads of wood—the whole length being 3 feet, and propelled by 20-ounce rockets. They looked like living fish under the water, darting in a true line with as great velocity. To perfect this arm, experiments must be tried on a large scale; possibly they might be made considerably heavier than water, and used on the principle of rockets; that is, to start them with an elevation approaching the surface of the water midway in their course to the enemy, and, gradually sinking towards the end of their course, strike and explode.

Their use can certainly involve but little detail in the construction of the guns or guides, for, when the torpedo is ready to be fired, it is no more weighty than water; and to start it, compressed air could be admitted behind the sabot at the moment of firing. This sabot in starting becomes a piston, which receives nearly all the starting pressure. It keeps the water from contact with the gases in the gun, which would otherwise be partly reduced or condensed; and, on compressed air being suddenly admitted, the powder will burn freely, and the inertia of the mass be gradually and delicately overcome. As the sabot leaves the mouth of the gun, it meets water at rest, and the onward motion of the torpedo frees it, when it will

rise to the surface. The delicate cap on the end of the torpedo will cause the explosion if it strikes at any angle outside of about 30° from its own line of course, so that the enemy may be struck in any position. It is within bounds to say that these torpedoes could be made to travel 36 feet a second, or at the rate of 25 miles an hour. In this case, if an enemy is 250 yards distant, it would require about 20 seconds to reach her. This tardiness will certainly require some dead reckoning on the part of the operator; but practice will soon give him complete control of the machines, so that, whatever may be the intervening tides or currents, or the swift motion of the enemy's vessels, he would be able to strike home, say, nine times in ten. Three hundred pounds of composition, requiring about twenty seconds to consume, would give a tremendous power for the propulsion of one of these projectiles.

However, the real value of this principle can only be reached by actual experiment on a large scale. As far as I have been able, I have experimented, but only with ounces of powder where tens or hundreds of pounds should be used, and should this arm prove a success, which I firmly believe will be the case, we shall have a most formidable weapon for harbor defence. Our heavy and expensive ordnance can be done away with, and fortifications will be looked upon as monuments of the past. Small floating iron-clad batteries could be moored at intervals across a harbor's mouth, and, armed with these torpedoes, and the calcium light for night-work, could render any seaport impregnable.

Mr. C. L. EMERY—Have you means for directing your gun under water?

Mr. WEIR—Yes; I have an arrangement, not for depressing or elevating it, but giving it a range of at least 60° fore and aft.

Mr. CLINTON ROOSEVELT—How does your plan differ from FULTON'S plan of Submarine Torpedoes?

Mr. WEIR—The experiments he tried were with an ordinary gun or cannon, I think. He would set the gun in position when the tide was low, and when the tide was up he would fire it off. He had also a torpedo, which he tried in 1812, to be screwed on the bottom of the enemy's vessel, and to go off by clock-work.

Mr. ROOSEVELT—Commodore ROGERS challenged him to blow him up, and he could not do it. The British Government justified the fitting out of coal transports to supply the Alabama, because our government gave me protection to go out to Russia during the Crimean war with my torpedo. My plan was to have the torpedo on a shaft that could be let down on approaching the enemy, and elevated when we did not wish to use it, placed on the bow of the vessel. The battery was made very sharp and long, so that the inclined plane would deflect the shot. I offered that to our government in 1835; and it is noticed in the Washington *Globe* of that year. I believe that is the first proposition for such a steam battery ever made to any government. I was requested to come to Russia, but did not go until the Crimean war was nearly closed. I claim to be the first to propose a practical plan for deflecting balls by an inclined plane. I think we shall have to come to that system at last, to have very long vessels, to go bows on and back off; because no armor can be made thick enough for protection against a shot striking squarely. The first monitor made by ERICSSON they did not dare to try a second time. The Merrimac, which was built somewhat after my plan, came out and challenged her, but she did not dare to accept the challenge. ERICSSON continues to make the turret larger and larger, so as to get the advantage of a long inclined plane. Commodore ROGERS found, on the Mississippi, that the balls flew off from a vessel upon my plan, just as they do from an alligator's back.

Mr. WEIR—The Keokuk, which was destroyed off Charleston, was made with a deflective battery. ERICSSON has not attempted to make deflecting sides, but makes his turrets larger to accommodate larger guns. At first he made them revolve with the gun carriage; but in later ones the gun carriage is movable and the turret remains stationary.

Mr. ROOSEVELT—Those he has made for his own country are made oblong.

The PRESIDENT—Mr. BUSHNELL, of Connecticut, was one of the earliest experimenters; long before FULTON, I think.

Mr. C. L. EMERY—I do not know that reminiscences of the war are in order, but it may be interesting to state some of our feelings when we were blockading the Mississippi river in the early part of the rebellion, when we had nothing but wooden walls, and were expecting a formidable iron clad down the river. In the discussions that took place among our officers at that time, it was considered unfair to come down with vessels of such a character. Why not come down in a wooden vessel and have a square fight? We could not help regarding with a feeling of dread an iron invulnerable vessel, which could fire at us without running any risk; and we thought it was unmanly for them to attack us without giving us a fair chance. It really seemed dreadful, and created more discussion than going by the forts at New Orleans. That was merely a rush to get by and take as few shot as possible. And when we had passed those tremendous forts, where the shot and shell was fearful, for there was probably more noise, and probably there were more shots and shells flying in the air at that time than at any other during the war—after all that, when we saw that little vessel steam out, it created more consternation among us than the whole engagement at New Orleans. But when we made up our minds what to do, and the Mississippi was set to run her down, she was run ashore and abandoned. I only mention these facts to show how these new features of warfare strike one at the time, and how much more formidable they seem than they really are.

It is undoubtedly true that a well-constructed iron vessel cannot be destroyed by a wooden vessel, unless it is so small that it can be run over, which was one of the plans we adopted at Fortress Monroe, when it was the design to run down the Manassas; but the captain of the wooden vessel was too much afraid of his wooden walls to attempt it. The system of torpedoes seems to be the only one by which an iron vessel can be destroyed. They may be made invulnerable above the water, and if well manœuvered cannot be run down except by vessels of a much larger size. This plan seems to me one of the best for that purpose, for it furnishes the means of propulsion under water. The *vis viva* of a shell is soon destroyed by its passage through water, so that if you fire it from a gun and depend upon its momentum, you will be disappointed. This torpedo has within itself the propelling force, the rocket powder, which will carry it to its desired destination.

A gentleman (Mr. ROOSEVELT) spoke of having been the first to propose inclined iron surfaces. In my travels I have found many persons who claimed to be the first, and who undoubtedly were the first, so far as they knew, to propose certain improvements. I remember, in Chesapeake Bay, the captain of a vessel who claimed that the Merrimac was built just according to his design. About a year before, he had designed the vessel and sent the plan to our Navy Department; but they paid no attention to it. Years and years before anybody imagined that iron boats could be used, he proposed iron plating, with inclined surfaces towards the enemy; and he proposed one feature which was certainly novel—that just before action, the seamen should go round and slush the plates all over, so that the shots would slip off.

Mr. ROOSEVELT—I challenge anybody to produce any record before mine.

Mr. WEIR—Mr. ERICSSON has a patent dated in 1832, for a monitor made with the sides inclined. It was made to look like a turtle's back.

Mr. ROOSEVELT—My battery can be made to run so fast as to be of some service. ERICSSON'S could not run fast.

Mr. EMERY—The gentleman certainly deserves a great deal of credit for his plan, for that plan was used on Western rivers during the war.

The SECRETARY read a paper by Dr. FEUCHTWANGER, the author being detained at home by illness.

Deep Placer Mining in California.

[Continuation.]

THE HYDRAULIC MINES OF DUTCH FLAT AND GOLD RUN.

THE towns of Dutch Flat and Gold Run, both centres of rich hydraulic districts, are situated on the ridge dividing the waters of Bear River and the North Fork of the American River, and are both on the line of the Central Pacific Railroad, which follows this ridge to the main Sierras. The hydraulic diggings here are very extensive and have been profitable to an unusual degree. The Blue Lead channel, to the south of the town of You Bet, which takes a bend to the east, passes through Little York and under this ridge, touching Dutch Flat, passing through Gold Run district, and debouching on the North Fork of the American River at Indiana Hill.

Dutch Flat, comprising an area of mining ground of about 640 acres, is situated at the confluence of two ancient channels—the Blue Lead, and a channel which comes down the divide between Bear River and the North Fork of the American, from east to west. Placer mining was commenced at Dutch Flat in 1849, and hydraulic operations on a large scale in 1856 and 1857. The main lead has a width of 2,000 feet and an average depth of 240 feet. Bed rock has been reached at only one point—the shaft of JAMES TEAFF—and has nowhere been stripped. The bottom is known to be very rich, but is excessively hard, and cannot be profitably worked without a bed rock tunnel. Two small mills were erected in 1868 and inclines sunk on the rim rock. Rich gravel was struck, but the expense of pumping and hoisting on such a small scale caused the abandonment of the enterprise. Hydraulic mining has been carried on here only on a small scale for two or three years past—the surface having been washed off to a depth of 100 feet or more, below which the gravel was found so hard as to require the use of large blasts. The present outlet will admit of another bench being washed off on most of the claims, which will pay well with the use of large streams of water through the improved nozzles.

Most of the ground at Dutch Flat is owned by individuals or companies in tracts varying from twenty to fifty acres. The most extensive mining property in the State owned by one individual is that of JAMES TEAFF. Besides his large area of ground, he owns a tail sluice over one mile in length, six feet in width and two in depth—one half of which is in tunnel. This tail sluice cost $55,000 and has been exceedingly profitable during active seasons. Three large ditches furnish water for the Dutch Flat and Gold Run districts—the principal ditch being that of the South Yuba Company. These ditches have an aggregate capacity of 7,000 inches. Water is sold at 12½ cents per inch.

Gold Run District—This district commences at the line of the Central Pacific Railroad and runs southerly two miles to Indiana Hill, below which the North Fork of the American River has broken through the alluvial deposit. The area of the hydraulic ground embraces 1,000 to 1,200 acres and is owned and worked by about forty companies. The auriferous deposit here is of great depth and the dirt much softer than at Dutch Flat; the consequence is that an immense amount of dirt is run off every season, and the natural outlet of the upper part of the district is fast choking up with tailings. Operations must soon be suspended here unless a bed rock tunnel is run. Surveys have been made for such a tunnel, which will be 4,000 feet in length, and when completed will ensure the continuance of hydraulic mining for many years. A prospecting shaft sunk to bed rock about the center of the district and the operations of the cement mill at its lower end have satisfactorily demonstrated the great extent and richness of the blue cement on the bottom. No blasting is required here, as the dirt and gravel can be run off down to the blue cement with heavy streams of water.

Hydraulic operations on a large scale were not commenced here until 1862. From that period to 1865 the gold dust was taken to Dutch Flat and other places for sale. We are indebted to Mr. FRANK MOORE, of MOORE & MINER, bankers at Gold Run, for the following statement of the amounts of gold dust bought by them from 1865 to 1870:

1865	$ 139,877 02
1866	237,908 62
1867	309,812 65
1868	259,188 05
1869	189,918 73
1870 (up to October 1st)	183,384 86
	$1,320,089 93
During this period there was produced from claims, in which M. & M. had an interest, not included in the above statement	62,814 60
	$1,382,904 53
Add fifty per cent. for gold-dust, produced in the district and sold elsewhere	691,452 26
Total	$2,074,356 79

It will thus be seen that in six years this small district has produced over two millions of dollars. These large returns are to be attributed to the quantity of ground run off by reason of the soft character of the dirt, rather than to its richness.

The most extensive claims in the district are those of BROGAN & Co., at Indiana Hill, a brief description of which will convey an idea of the character of mining operations here. This company have a large area of ground, exposing a face of bank 240 feet in height, all of which, except some thin layers of pipe-clay and sand, is pay-dirt, with no indication of the proximity of the lower strata of blue cement. The bank exhibits alternate layers of hydraulic dirt, gravel, sand and pipe-clay, with an occasional layer of lignite, a few inches in thickness, which is found at a depth of from 200 to 240 feet. They run 1000 inches of water per twenty-four hours, through two Hoskin nozzels, four and a half inches diameter each, under a pressure of 290 feet. The Hoskin's nozzle is a local invention, and does not materially differ in its operations from those already described. Formerly 500 inches were run, in four streams of two and a half inches diameter each, requiring a man to each stream. Through these streams water could be effectively thrown more than 100 feet; but the improved nozzles will do execution at 200 feet, dispense with the labor of two men, insure safety of human life in case of the banks suddenly caving, which may be always anticipated here from the height of the bank and the softness of the dirt, and will run off 100 per cent. more dirt than the same amount of water run through two and a half inch nozzles. This immense body of water is conducted from the ditch to the distributor in iron pipe 500 feet in length, having a diameter of 27 inches at the discharge-box. The pressure is so great that the strongest distributors, made of cast iron, one half inch thick, are required, and these sometimes burst. Messrs. BROGAN & Co. will open this ground next season through their new sluice-tunnel, 1200 feet in length. This tunnel, which is forty feet above bed-rock at its starting point, and probably one hundred at its terminus, the ground getting deeper as it runs back in the hill, will be continued 700 feet further, until it reaches the back line of their ground.

Indiana Hill Cement Mining Company.—The only cement mining carried on here is by the Indiana Hill and Mining Company, at the lower end of the district. This company commenced operations several years since, at a point where the ancient channel bed-rock is broken off and denuded by the deep gorge through which runs the north fork of the American river. This company have ground 1600 feet in length by about 400 feet in width. The width of the channel at this point is undefined, and extends for several hundred feet on either side of this company's ground; or perhaps there is a confluence of two channels here. The claim is worked through a tunnel now 200 feet in length, 20 feet in width, and 10 feet in height, from which drifts have been run 100 feet to the west, and extensive breastings made. Although ten feet in height of pay has been taken out, there is milling cement left overhead. The tunnel is run on the bed-rock, and drains the ground as it progresses. The car-loads of cement are run out on a tramway a distance 600 feet from the mouth of the tunnel to the mill of the company. This is an eight-stamp mill, run by a "hurdy gurdy" wheel eight feet in diameter, using 75 inches of water under a pressure of 75 feet, and has a crushing capacity of 30 or 36 tons per day, according to the hardness of the cement. The cost of the milling and mining will probably not exceed $1 50 per ton. The claim is worked very skilfully and economically. The occurrence of large boulders and the hardness of the cement renders expensive timbering unnecessary. Very little water has been met with, and that runs off by the tunnel. The officers decline at present giving a statement of their receipts and expenses. Twenty men are employed, and rumor says the company is clearing $100 per day over expenses.

BETWEEN THE NORTH AND MIDDLE FORKS OF THE AMERICAN.

The country between the North and Middle Forks of the American River is an elevated mountainous region, no part of which is less than 3500 feet above the level of the sea. The whole country is cut up by ravines and tremendous cañons of great depth and grandeur, and presents features of natural scenery rarely equalled even in California. This scenery has been graphically described by BAYARD TAYLOR in "At Home and Abroad." This region contains probably one hundred square miles of mining ground, the greater part of which is covered by lava and volcanic matter, and is opened and mined through tunnels. Mining operations have not been extensively carried on since 1866, when the following amounts of gold dust were shipped through the express offices of the prin-

cipal towns. The figures are from the books of W. VAN VECTOR, assessor for that year:

Forest Hill	$367,000 00
Todd's Valley	148,482 00
Michigan Bluff	400,000 00
Iowa Hill	163,633 92
Total	$1,079,115 92

Add to this twenty per cent. for dust carried off to other localities, and we have a product of $1,414,939 10.

The country between these rivers is but scantily supplied with water, most of the districts being limited to a supply of 1000 inches, and even this cannot be depended upon for more than a few months in the year. Should Col. VON SCHMIDT's magnificent enterprise of tapping Lake Tahoe, and bringing its waters through this region to the foothills, and thence to San Francisco, be completed, we may look for a revival of mining operations here which will remind us of the flush times of '49-'50. A recent number of the San Francisco *Bulletin* gives the following details of this great undertaking:

"The proposition of the company is to furnish water to the State for mining and irrigating purposes. An act of Congress confers all the privileges under the general law—required for right of way—to the Lake Tahoe Water Company; also, giving them the right of the water. Failing to secure the co-operation of the State, the company incorporated, and now contemplate carrying out the enterprise under private management. Col. VON SCHMIDT, the engineer who made the surveys, has tendered information of the enterprise to our reporter, and we publish it as part of the news of the day. The area of the lake is estimated at 250 square miles. One foot in depth of this surface would give a daily supply for the year of 13,748,252 gallons. If required, the lake can be raised six feet by a small dam at its outlet, and can be drawn six feet below its present surface, which would give twelve feet of water from the entire surface of the lake, or 164,899,024 gallons per day. But should the company take all the water that discharges itself from the outlet now running down the Truckee river, and supplying the mills at Reno, Nevada, there still would be more water in the river below, than can possibly be used by the mills, for the reason that so many large streams of water enter below the point of the dam. The dam has already been constructed at the outlet of Tahoe into the Truckee—for a distance of four miles. In the spring the tunnel will be commenced, running through the Sierras in a westerly direction for a distance of three miles. At this point the water will be turned into the north fork of the American River, and will follow the bed of the river for a distance of twenty-five miles. The water will be diverted from the river on the Auburn side, and carried to that town, by a canal. From Auburn it is proposed to bring the water to San Francisco, Sacramento, Vallejo, Oakland and other localities will have opportunities to avail themselves of water at moderate cost."

It is estimated that $20,000,000 in gold have been taken out from around Forest Hill alone, and that an abundance of water would revive the placer mining interest in that and adjacent districts, and render claims profitable that are now worthless. The principal mining towns are Iowa Hill, Damascus, Todd's Valley, Michigan Bluff, and Forest Hill. Michigan Bluff is on the middle fork of the American, and possesses a large body of hydraulic ground, with an average depth of over 200 feet. The principal interest of Forest Hill is in cement mining. The cement is mined by tunnels, and drifts run under the lava crust, and crushed by mills. This branch of mining has not been actively prosecuted for the past year, for want of capital, although there is much unworked ground. Four mills are idle; one working regularly, and one at intervals, and six or eight hydraulic claims worked on a small scale. The product of Forest Hill district for 1870 will slightly exceed $200,000. At Bath, near Forest Hill, there is a claim which is an exception to the general rule of the "pay" dirt lying nearest the bed-rock. In this claim the pay lead is many feet above the bed-rock—in some places 150 feet—and is confined in a very thin streak from six to sixteen inches in thickness, very hard, and of a rusty appearance. This lead runs almost on a level into the hill for several thousand feet, and has been worked with regular and profitable results for three thousand feet.

Zinc and its Compounds—Their Uses in Domestic Economy and Medicine.

By DR. LEWIS FEUCHTWANGER.

THIS metal has of late years become one of the most useful articles in domestic economy, and for utility must rank next to iron. For manufacturing purposes where copper was formerly employed, zinc has now taken its place. The various manufactures of zinc, its castings and galvano-plastic productions, the household utensils and conveniences, such as baths and signs, also vessels for culinary purposes, for alloys, coating other metals, for the production of electro galvanic and electro magnetic instruments; also for galvanizing iron, copper and brass; as a substitute for lead in roofing houses; in place of bronze in casting statues and other objects of art, both on a large and small scale, this metal offers considerable advantages. The effect of zinc castings, whether with a surface of zinc or with another metallic coating, is of great interest, considering particularly their cheapness and comparative lightness, so as to be the means of forming cheap duplicates of objects of high art existing in the more costly materials of bronze or marble.

The use of zinc for preventing the oxidation of iron, its aptness for perforation, and its general application to domestic purposes, are all well known. It is obvious that on many accounts it may be advantageously applied to a larger extent, especially in cases where the unyielding character of iron, and the high cost of copper, present obstacles to their use. It cannot be doubted but that zinc will before long be employed for statuary and the casting of small groups of figures and ornaments. Among the late improvements in printing, zinc has lent its powerful aid. By the invention of zincography and heliography—the first refers to a process by which ancient or modern engravings, and also modern impressions and drawings, executed either with the pen or the pencil, are transferred to a zinc plate, and a peculiar ink is employed for the purpose—not only is a perfect fac-simile of the original obtained, but copies to any extent of this fac-simile of the original thus obtained, and copies to any extent of this fac-simile are again produced, at an exceedingly moderate price and all of equal excellence; every kind of drawing can be executed in this ink, and it has therefore the great advantage, that it enables artists at once to fix and reproduce their sketches, instead of having recourse to lithography, wood-cutting or engraving on metal, and the most rapid and evanescent expression of an artist's thought may thus be corrected, without impairing the spirit of the original sketch in the process of transfer.

Heliography is one the latest inventions in photography, effected by transferring the picture obtained on the zinc plate and etching it by means of acids, and then exposing it for a time to the rays of the sun and submitting it to a secret process before printing. The picture on the frontispiece of my work on gems was thus executed in this city, and is pronounced a success.

Zinc has been known to the Chinese for a long time, and was brought to the notice of the Europeans in the sixteenth century. Native zinc in its metallic state is extremely rare. It has been found in a basaltic rock in Australia, near Melbourne, but it is found in great abundance, when combined with sulphur and called blende, or with carbonic acid, smithsonite. With silica it is called the silicate or electric calamine, on account of its being pyro-electric; when combined with oxygen it is the red oxide of zinc, usually found in foliated masses and of a deep red color. It is found in connection with franklinite, which likewise contains zinc, iron and manganese, in New Jersey, the only locality in the world.

Zinc has also been detected in the vegetable kingdom, in a peculiar violet flower growing on the calamine hills of Rhenish Prussia.

Blende, calamine and the red oxide are used for reduction in the various works of England, Germany, Spain, Hungary and the United States. The name blende is derived from the German word *blind*, a name given by the miners, as they were deceived when looking for lead and copper; they met with this ore, which they considered worthless. It is also called *black Jack* by the miners.

Besides the last-mentioned ores are a number of minerals found in many localities of the world, which contain more or less zinc in combination with other interesting substances, such as the following:

A mineral, called Hopeite, found in the calamine mines of Aix-la-Chapelle on the Rhine, which is a phosphate of zinc.

Aurichalcite is a rare mineral from Spain, which contains zinc and copper.

Greenockite or cadmium-blende is often associated with zinc ores.

Goslarite, from the Hartz mountains, is a mineral consisting of the sulphate of zinc.

Kœttigite, a mineral from Saxony, contains zinc combined with cobalt and arsenic.

Hydro-zincite is also called zinc bloom, and is mostly found as incrustation in the zinc mines.

The metals which accompany the zinc ores without altering its physical character, are cadmium and indium. The first was discovered by STROMEYER in 1817, and the latter discovered by REICH in 1861, by means of spectrum-analysis, as it imparts a blue color to flame and its spectrum is characterized by two indigo-colored lines. Both these interesting metals are only found in zinc ores, more particularly in blende.

The localities of zinc ores are very numerous in every part of the world, and mostly in the neighborhood of lead mines, with a few exceptions. In the United States zinc blende, both yellow and black as well as calamine, are found in great abundance in Maine, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Missouri and Wisconsin; more particularly in the last five States, as also in Virginia, in Wythe county, where the calamine has been mined and exported to Europe.

The principal smelting works for the production of the metallic zinc called spelter, when brought to market in the form of inch thick plates, and in sheet form of various thicknesses, and in wire of various sizes, are in England, Belgium, Silesia, Hungary, Spain; and in the United States, in New Jersey (Newark), Pennsylvania (Bethlehem), Missouri and Wisconsin. The methods applied for the reduction of the various zinc ores differ much according to the materials used in the work. Blende is mostly employed in Silesia, the carbonate or smithsonite in England, while in the United States the calamine and the red oxide are mostly used as reduction materials. The theory is very easily explained, and is based on the fact that zinc ores when exposed to great heat are very volatile, and easily converted into vapors, which are led into coolers, whereby they are condensed into solid metal. In Silesia, the process of reduction is pursued in the following manner: The ores are roasted in large open furnaces for several hours, oxidation ensues, they are then transferred into muffles made of fire clay, which are placed in a receiving furnace, previously, however, mixed with coal dust. The muffles having the shape of retorts with necks, lead the rising vapors into small cooling vessels; there are ten muffles which fit in one reducing furnace, and require twelve tons of coal to reduce one ton of the metal, at which operation 40 per cent. is driven off from the original weight of the ore.

The Belgian process is somewhat different; the operation being performed in earthen tubes of three feet in length, and four to five inches in width, which hold about forty pounds of the roasted ore; a cast-iron pipe is then attached to each tube, when, after exposing them to the red heat in a large furnace, the metallic zinc condenses in them and is drawn off every two hours.

The English process is executed in covered crucibles, which are placed in a circular furnace, like a common glass furnace, which is heated by a single fire-place in the middle, but openings in the bottom, into which a conical tube of sheet-iron is introduced, to which end also a large sheet-iron tube is attached; in this the vapors of the zinc are condensed while being led into water. Coal is used in England, while coke is employed in Belgium for reduction. The crude zinc or spelter obtained by these various processes is not quite free from impurities and other metals adhering to it, such as lead, cadmium, arsenic, carbon, etc., all of which cannot be got rid of without another distillation; the crude metal has to be dissolved in a dilute mineral acid and precipitated by carbonate of soda, the precipitate mixed with purified lampblack, and then redistilled in earthen retorts.

The physical characters of zinc are the following: It is a bluish-white metal, of a peculiar taste and of perceptible smell when rubbed; of a crystalline structure; at ordinary temperature, brittle, but when heated to 130°, may be rolled out in sheets, and when heated to 300°, becomes again brittle, so that it may be broken up and pulverized; it has a specific gravity of 6.8, and its equivalent is 32.99, and its symbol Zn; it fuses at 773°, boils at bright heat, and then volatilizes; it takes fire in the presence of atmospheric air, and burns with a luminous greenish flame, which is the oxide of zinc, which was formerly called flowers of zinc, or philosophers' wool. When zinc is exposed to moisture it remains unaltered; for this quality it is so much used in the household for external purposes, such as roofing, business signs; galvanized iron, such as nails, spikes, chains, cables and ship furniture, which is effected by merely dipping those various articles in melted zinc, is in great use, as it protects them from rust, corrosion and destruction. With tin and mercury it forms an amalgam and excites electricity; it is also used for obtaining hydrogen gas by means of sulphuric acid.

The most important alloys with zinc are brass; when some tin is added to the copper and zinc which forms the brass, it is bronze; when nickel is added to the mixture of copper and zinc, it is called German silver, which forms a beautiful white composition; while brass, bronze and other alloys form yellow compositions of all shades, from bright yellow to brown red.

Zinc combines also with lead and tin, and hardens them; but does not harmonize with bismuth, and hardly with arsenic and antimony.

The importations of spelter and sheet zinc from Silesia, Belgium and England are very extensive, as may be seen from the Custom House report of the city of New York, where it is stated that in the last three months were imported, of spelter alone, 130,173 plates, of twenty-eight pounds each. We may fairly compute the importation of spelter at three millions of pounds; of sheet zinc over two millions of pounds, and over two millions of pounds of oxide of zinc, or white zinc paint. In Missouri, the spelter has been produced for a year past; also, in Wisconsin, but not in sufficient quantities to interfere yet with the large importation. In Bethlehem, Pennsylvania, spelter has been manufactured in considerable quantities, which has been pronounced superior to the English and Silesian spelter. Sheet zinc has, to my knowledge, not yet been produced in the United States; it is extensively imported from the Vieille Montange works, in Liege, in Belgium.

Sulphate of zinc, called white vitriol, is a mining product, a soluble salt, which crystallizes in long prisms, and forms a series of double salts with alkaline sulphates. For medical or other chemical purposes, it is dissolved in water, boiling the solution with oxide of zinc, and then re-crystallizing the sulphate. White vitriol is much used in the arts, and also in medicine, as a powerful emetic, particularly in cases of poisoning, where prompt action is indispensable.

Carbonate, acetate, iodide, bromide, cyanide and other salts of zinc are usefully employed in medicine, but not in the arts. The compounds of zinc are all poisonous, but not to the same extent as those of lead—sufficiently for the oxide of zinc, now extensively used in painting in place of white lead, to be capable of producing colic resembling that from white lead, and is called also the *colica pectorum*, for it attacks workmen exposed to the dust of the oxide, while engaged in packing it in barrels; it yields likewise to the same treatment as the lead-colic.

The alloys of zinc with copper and with nickel, and also that of copper and tin, deserve, on account of their great importance in daily life, more than a passing notice.

Brass, which is composed of copper and zinc, was formerly made from copper scraps or clippings and calamine, or from blende and charcoal; latterly the method of casting brass has been changed into the following mixture of fifty parts old brass, fifty granulated copper and twenty-five zinc melted in sand, or black lead crucibles about sixteen inches deep are exposed to a white heat in the well-known air furnaces for four hours, and the fleece brass poured out in iron moulds with the precaution of stirring the mixture before pouring with an iron rake in order to bring any light foreign matter to the surface, and instead of iron moulds, granite blocks are used. Its composition will then be two equivalents of copper to one of zinc or the formula Zn, Cu_2, but according to the various purposes for which the brass ingots are used such as either for transforming in sheet brass or wire, the proportions are altered; a little iron hardens it and diminishes its tenacity and malleability; tin renders it harder and stiffer, even one-half per cent. alters its ductility; lead imparts to brass a harshness, which renders it suitable for the lathe.

The gold-yellow color of brass and the various proportions of zinc changes its colors; tombac is a red brass and contains eighty-two per cent. copper and eighteen per cent. zinc, and Dutch metal or foil or spurious gold leaf, which is a pale yellow brass hammered out of their leaves, contains a small portion of zinc; the Lyons and Sporzheim gold wrought up in jewelry is nothing but brass, but subjected to a peculiar treatment,

which consists in heating thin copper bars or wire in earthern tubes with zinc—the fumes of the latter boring the copper externally.

Brass solder is prepared by two parts of brass melted with one part of zinc. Brass when tempered diminishes in density and increases in bulk in proportion to the copper and has a specific gravity of 8.20 to 8.95, and it expands from 32° to 212°. Good brass melts at twice the temperature of red heat, which is about 1869°.

Bronze, which is an alloy of copper with tin and zinc, is generally known by the name of antique and modern bronze—the former consisting of copper and tin, while the latter contains also the zinc and sometimes no tin at all, so that modern bronze is but a brass with an excess of copper. Bronze, when exposed for a length of time to atmospheric agents, assumes a peculiar greenish or olive hue, arising from the formation of a basic hydrated and carbonated oxide of copper.

This color is very attractive; for attaining this result many experiments have been made. Generally any salt of copper dissolved in water or weak acid is applied to the surface with a brush, or the objects are immersed in the solution in which parts of verdigris and one part sal ammonia are dissolved—vinegar, fine oxalate and nitrate of potassa with blue vitriol are likewise used for the purpose; the tint of colors may be varied by the mixture of saltpetre, common salt and sulphuric acid. A solution of palladium—chloride and black lead and peroxide of iron has been successfully employed for bronzing, which is said to produce a fair and permanent coloring.

Argentan, or German silver, is the other alloy above alluded to. It is said to have been manufactured in China under the name of Packfong, in Germany, since 1824, and in this country was first introduced and manufactured by me in 1833 from the copper nickel. This alloy is composed of copper, nickel and zinc in certain proportions, varied in whiteness or softness according to the uses for which the composition is intended. The proportion which I used for a white and soft metal to roll out in sheets was fifty per cent. of copper, 25 per cent. of nickel and 25 per cent. of zinc. In order to prevent any loss of zinc by volatilization, it is well to mix the same with the copper, which is put on the bottom of the crucible and the nickel on top, so that when the red heat begins to soften the copper, the nickel, which is more refractory, also becomes soft and melts.

The quality and adaptation of German silver vary with the proportion of the metal and the purity of the nickel. I have teaspoons, which have been used in my house since 1835, and look like old sterling silver. Examine these pennies, of which I issued in 1837, with the permission of the United States Government, over one and a half million pieces, made with the properties above given, and you will acknowledge that this composition challenges the silver for wear and durability, for the nickel penny which contains but twelve per cent. of nickel, has more the appearance of old brass.

German silver is now very extensively used for spoons, forks and other domestic utensils, and as castings for philosophical, mathematical and surgical instruments, gun mountings, harness and carriage furniture, &c., &c., &c. If the nickel is pure, the composition will wear very well; it should, however, not be used in vinegar or with acid fruits, and its surface should always be kept clean and bright. It is far less likely to prove injurious than articles of copper, and brass and it may well be substituted for them.

Dr. F.s lecture was illustrated by specimens of the Heliographic art, of metallic zinc, cadmium and metallic indium of brass and bronze, his German silver cent issued in 1837, resembled a sterling silver old coin. Of the minerals containing zinc such as the blende, calamine, smithsonite, aurichalcite, and the red oxide of zinc, and of the most important chemical and medicinal preparations, such as the white oxide of zinc or zinc white, the chloride of zinc or Sir WM. BARRETT's liquid, sulphate of zinc or white vitriol, aecetate, carbonate, and bromide of zinc.

The Definition of an Alloy.

IT has been proposed in England to call alloys chemical mixtures. That they cannot be called mechanical mixtures, the fact that only the forces at the command of the chemist can separate them into their constituents fully proves. By no merely mechanical means could alcohol be separated from water or the zinc from brass; heat would, in both cases, play the principal part—and this force belongs to the domain of chemistry.

As some metals will mix in any proportions, but still partially retain the character of chemical compounds, no objection can be made to the new definition. The term seems a fit one to rank between chemical compounds and mechanical mixtures—the place always assigned to the combined bodies in question.

By calling them mixtures the idea is at once discarded of their components being in any definite proportions, and the term chemical fully expresses the intimate nature of the mixture which only chemical forces can separate.

Disinfecting Cotton.

IT has long been known that the best disinfecting agent for wounds, cancers, ulcers, and decaying animal matter is the permanganate of potash. Dr. FRESENIUS possesses a method for applying it which seems to overcome many of the difficulties hitherto felt in practice, and this consists in saturating gun-cotton with a solution of the permanganate of potash. The gun-cotton is not decomposed by the manganese salt, as ordinary cotton is, but seems to expose and keep the greatest amount of surface for the action of the disinfectant. Bandages of the gun-cotton thus saturated with permanganate of potash can be readily applied, and in cases of open wounds, cancers, and the like must prove very acceptable to surgeons. The gun-cotton is harmless as long as it is wet, and is an article that can be obtained in any quantity since its great use in photography. Permanganate of potash must be applied in solution in order to be effective, and is an agent that ought to be more generally known and applied in this country than it has hitherto been.—*Journal of Applied Chemistry.*

MINING SUMMARY.

Utah.

SALT LAKE CITY BECOMING A FOCUS OF MINING OPERATIONS — THE LITTLE EMMA MINE SPECULATION.

A correspondent of the New York *Sun* thus writes from Salt Lake City, April 2: Everything in this city is changed. Property in the centre of business is going up to fabulous prices, and buyers are eager. For the main street, or East Temple street, as it is recorded, there is not an empty store to be rented, and every available spot is taken for building purposes. With his eagle eye, ever open for chances, the irrepressible Brigham is cutting a block in two, where he owns the land, and is making the enterprise profitable to him, and greatly enlarging the facilities of commerce in the right place. To-day the business street of Salt Lake City is as crowded with mineral offices displaying rich ores, agencies, and law offices as Denver was in its palmiest days. The report of the officers of Swansea Smelting works concerning the great wealth of the Emma mine, has drawn to this city three scions of British aristocracy. They are visiting the mines for the purpose of investing in anything that is worthy of their attention. These gentlemen represent great wealth, and mean business.

THE NEW YORK PURCHASERS OF THE EMMA

On the day before yesterday half a dozen gentlemen, prominent capitalists of your city, arrived here with the oldest of the firm of WALKER Brothers, merchants here, for the purpose of taking possession of the Emma mine, which they had bought in New York for $2,000,000. Two months back this same mine, or three-fourths of it, was understood to have been sold to California capitalists for $900,000; but, taking advantage of some condition in the agreement which permitted them to withdraw, the proprietors held on to it. A young man, named TEN EYCK, backed by a Mr. DAVIS, of California, succeeded in getting the Emma bonded to him for a million and a half, and with the necessary papers he proceeded to your city and negotiated with friends represented by DUNCAN, SHERMAN & Co. for the two millions. The said Emma will undoubtedly be put on the market at five millions, and its stock readily taken up; and thus money makes money.

THE LYON CONTESTANTS.

The report in circulation about a lawsuit instituted by one JAMES E. LYON, of New York, has good foundation. Mr. LYON obtained an injunction last September to prevent the claimants of the Emma from continuing work upon the mine; but Chief Justice MCKEAN reconsidered the grant and reversed the decision after a week's legal lore had been expended *pro* and *con*. The proprietors of the Emma were so alarmed at the claimant's position, that they engaged one legal firm with a fee of $10,000 to begin with. Before the party now purchasing concluded to risk litigation, they consulted Mr. EVARTS and another legal gentleman in New York, and they are satisfied that they can hold it against Mr. LYON. The latter is, apparently, as certain of gaining possession of it, and is seeking to bring it before the courts of New York, where he claims to be a citizen.

THE SALE OF THE MONTEZUMA.

A firm in New York bought yesterday the controlling interest in this mine for $160,000. The WALKER Brothers had also the lion's share in that mine, and the senior partner already referred to made the conditional sale in New York last week. The Montezuma is situated within a short distance of the Emma, higher up on the same hill, and promises to make as much noise as that celebrated treasure. There are a dozen other ledges on the same mountain that are taking out paying ore. The snow has been seven feet deep in that cañon all winter, but notwithstanding this, travel has been incessant. Three days ago, an additional two feet of snow fell in the cañon, but it does not dampen the eagerness of visitors. The rapid development and high sale of the Emma is setting up figures everywhere, and men who have not money enough to buy a dinner are holding on to their ledges in expectation of high prices when the snow clears off the mountains. A good story is told here of a person owning a mine in East Cañon, who was offered some time ago $25,000 for it; but he asked double that amount. The party offering to purchase finally agreed to give $50,000. The owner went back on his offer, and it has been advance and withdrawal, till it now hangs on the offer of $150,000. This is a fair illustration of the condition of buyer and seller. All men here, or who can come here, are not going to make fortunes; but it is certain that much money will change hands within the next six months.

The Mormon leader has fought the development of the mines with bull-dog grit; but he caves to destiny, and has counselled the brethren everywhere to form mining districts, frame their laws, and control, if possible, the Gentile population that is spreading throughout the territory. Where minerals have been discovered near the settlements, he has ordered this peremptorily, and a very sensible thing it is, "if it will only stick." He will, however, make a desperate effort to preserve the settlements, and the Saints have preempted every acre of tillable land around them by his instructions. His reign is not over, though it is mighty shaky, and he follows, to a dot, the example of his illustrious patron saint—Cardinal RICHELIEU.

TELEGRAPHING TO THE MINES.

The Deseret State Telegraph Company have extended their wire up into Cottonwood Canon within the last ten days, and now New York can communicate with Central City—at the foot of the Emma mine. The same Company are extending their wires wherever there is a mining camp north, south, and west.

The first step that threatens Mormon peace is the general hostility of the young to polygamy, and the preference of the misses for a bachelor Gentile to a hoary-headed polygamist. Without a particle of regard to the feelings of many married women, the Mormon husbands have taken home young wives, and almost abandoned their first families. The children of the first wives have seen the misery of such a life, and as they have grown up to an understanding, they have naturally steeled their hearts against the cause of their mother's misery. Polygamy is a decaying institution. This influx of Gentiles from other States and countries would kill it quicker than a thousand acts of Congress.

EAST CANYON.

A correspondent of the Corinne *Reporter*, writing March 20th, says: An English company, from London, with a capital of $750,000, have located here, with WM. DOOLITTLE, lately master of carpenter work for the U. P. R. R., as their manager. They also send out from London a secretary, treasurer, and master of miners, and will go to work with nerve, backbone, bottom, and capital, prepared to work mines on a systematic plan, and build smelting works with machinery from Swansea, Wales, erected by masters of the art, who can work ore that only yields $20 per ton in silver. They have located here, having bought a mill site and town property to go with it. The Velocipede mine is about being sold for $20,000. It is reported that the Mountain Lion has been sold for $220,000. Application is being made to have this town located under the United States laws of 1864. Hotels are all full with men whose pockets are full; yet times are dull, and butter 50, eggs 25, potatoes 2½, flour $5.50.

California.

The San Francisco *Bulletin* urges upon the attention of capitalists, and the people generally, the importance of the gold quartz mining interests of California, and is of the opinion that less attention has been given to this branch of mining than it deserves. Says the *Bulletin*: "Both in number and richness they (the gold quartz lodes) are far more important than they are generally known to be, and the comparative neglect to which they have been consigned would be unaccountable but for the craze over silver mines caused by the discoveries in various parts of the Nevada basin. Our people, at last, are beginning to realize the truth of the old proverb, that 'it takes a gold mine to work a silver one,' and to inquire if the gold mine is not worth working for its own sake. Considering the vast extent and richness of the placer deposits, covering the western flank of the Sierra Nevada, for some six hundred miles, and opening more prolific sources than ever in the deep hydraulic banks, we get an idea of the wealth of the thousands of quartz ledges, whose upper masses only were degraded and distributed to form the auriferous diluvium. As these rocky matrices are found, here and there, where still faintly outcropping or slightly covered, they prove to be storehouses of wealth. Discoveries of them are constant, from one end of the State to the other—from Siskiyou to San Diego—and the facility with which they can be worked is far in excess of that attending silver mining. Many of them are profitable with low cost mills, or even arastras, and they are usually more accessible, and better located with reference to wood and water supplies, than the silver lodes of the Sierra."

LAKE COUNTY.

The Lakeport *Avalanche*, of March 18th, thus refers to the mineral resources of this county: The Redington quicksilver mines, which are located in this county, return immense profits to the stockholders. We learn that no assessment has ever been levied by the company, the mine paying expenses from the commencement. The yield is limited, by agreement, to 2,000 flasks per month, and could be greatly increased if desired. On the east side of the Clear Lake an enterprising company are engaged in extracting large quantities of sulphur. This is shipped to San Francisco, much of it being used in the manufacture of powder by the Pacific and California Powder works. There is a fine deposit of borax in Borax Lake. The bottom consists of a bed of black, jelly-looking mud, which is full of borax and soda. The borax is found in crystals, and obtained by dredging, and is separated from the mud by washing. The average production is about two tons per day. A bed of the finest limestone has recently been discovered near this place, and will be turned to profitable account.

REVIVAL OF MINING INTERESTS.

The Folsom *Telegraph*, of March 18th, says: Quite a revival is taking place in mining localities in this vicinity. All along the North Fork and on the north bank of the American, miners are ready to go to work as soon as the water comes along in the North Fork ditch. At Independence Flat new and rich claims are being opened, and new claims located. At RHODES' Diggings the prospects are good, and, in claims between Willow and Alder Creek, good pay is anticipated. In town, CHRISTY's, MORRIS', DUNCAN's, and other claims are said to be paying well. At Bunker Hill several hydraulic claims are extensively worked, and their owners are being rewarded. Willow Spring Hill still rolls out its regular dividends in all the claims now being worked.

GOLD DISCOVERIES IN THE SANTA CRUZ MOUNTAINS.

The San Jose *Independent*, of the 22d instant, says: For several days there has been quite an excitement among some of our citizens in regard to reported rich discoveries of the placer gold mines in the Santa Cruz mountains, the exact location of which has been and is still kept a secret from the mass. Yesterday morning Captain BLAISDELL, Mr. GOFF and others, left San Jose for the new El Dorado, and the opinion of many is that they know where an exceedingly good thing is to be found, from certain hints let fall by them prior to their departure. We ourselves knew nothing definite in regard to the matter beyond the street rumors; but we do know traces of gold can be found in many of the cañons leading to the San Lorenzo and other streams. We very much doubt, however, whether it will ever be found in paying quantities.

MINING IN NEVADA COUNTY.

The Nevada *Transcript* has the following mining items from the upper part of the county: At Moore's Flat, KNOTWELL & ATWATER have put up a new rig on their claims and have two of FISHER'S Hydraulic Chiefs with which to do the washing. A few days ago their reservoir was broken by a cave, and it will take about ten days to repair damages, when they will commence washing. The Illinois Company are putting new pipe and apparatus on their claim, and are raising a shaft preparatory to commencing work. The Eagle Company have recently discharged two blasts, breaking up the ground, and will commence washing in a few days. Woolsey's Flat has a fair prospect of being as lively as it was years ago. Four companies are working extensively, and the working forces will be increased during the season. The Blue Bank ground was unworked for a number of years, until opened last season, and the owners have a splendid prospect. They run a head of 650 inches of water, using the modern machinery for hydraulic mining, and are making a good thing. The Boston Consolidated Company (HAGARTY & Co.) are running a tunnel and stripping the surface, preparatory to getting to work on the big pay channel. The X I X ground, owned by MARKS & Co., is being washed. The banks are 200 feet high and the ground good. ALLENBURG & Co. are running a bed rock tunnel, putting in a new rig for hydraulicing, and will be ready for work in a month. At Orleans Flat prospecting is being done with encouraging results. At Eureka and vicinity some gravel prospecting is being done, and the quartz interests look promising. The Erie is paying exceedingly well. Other mines are also being prospected in the vicinity, and the amount of prospecting will be increased as soon as the snow is melted in the district. The Baltic Company, at Henwood's Ranch, J. M. C. WALKER, Superintendent, made their initial clean-up yesterday, after a run of two weeks, and took up the nice little sum of $1,200.

MARKET REVIEW.

The Coal Trade.

NEW YORK, April 15th, 1871.

"Wars, and rumors of wars," daily reach us from the various coal mining regions, resulting from complications in the present suspension, and an effort to reach some settlement of the difficulties. Many of these reports, as published by the daily papers, are greatly exaggerated, and their columns to-day are employed in contradicting their reports of yesterday. This coal question seems to be a wonderfully popular subject for newspaper leaders, and has afforded immense capital for the daily press throughout the country, because it seems to be capable of being delineated and expanded to suit a morbid desire for murderous riots and the like; as far as any correct or reliable information is concerned, we defy anybody to glean the slightest particle from them that is satisfactory. We doubt very much if the suspension would have lasted over six weeks, had not all the persons—parties to the fact—been influenced by the exaggerated and inflammable reports appearing in our daily papers, which created such excitement at the time, and gave undue importance and public notoriety to the various leaders.

Notwithstanding the high rate of tolls, there is a fair supply of coal coming to the market. It would therefore appear that the embargo of the railroads has not proven a complete blockade after all. The amount of anthracite coming forward, together with the increased production of Cumberland coal, is sufficient to keep a steady market, but, of course, at prices that will enable the operator to pay the high rate of tolls. Hence the suspension can be continued for an indefinite time, and yet no actual famine result.

The trade has had recourse to these strikes or suspensions for years back, as a means of regulating the supply of coal. Had not such been the case at present, there is no doubt but that many of our coal operators and wholesale and retail coal dealers would have long since been bankrupt. Our immense capacity for the production of coal, and our increased facilities of transportation to market, has, for years passed, created an over-supply, which had to be done away with by some means. The last few auction sales of coal in this city, by the Scranton Company, showed plainly to what we are drifting. The prices obtained at those sales—(and they, in a measure, controlled all prices)—positively showed a heavy loss; and how long any business can be continued in this manner, we leave any good business man to answer. The average prices for Scranton coals at the last three sales—viz., for September, October, and November—was $4 21 per ton, which, all will acknowledge, is far below the cost of mining, preparing, transporting and handling in the market, without paying a living profit to those whose capital and energies are interested in it.

Had we then continued the production, week after week, what would have been the result? A continuous decline, of course; and in this manner it must have graduated, until, sooner or later, bankruptcy would have reduced the number of producers. The amount sent to market would have then become so small as not to augment the stock on hand. Thus the same effect would have been produced, as that occasioned by the present suspension, but it would have extended over a period of months—perhaps years.

During all of this time little or no profit could have been made by either operator, miner, transportation company, or wholesale and retail dealer. One not intimately acquainted with the trade cannot form any idea of the vast accumulations of coal throughout the country, when that article is cheap, particularly by large manufacturing companies, many of which, when the article can be bought for from $4 to $5 per ton, keep a constant supply on hand or stored, of from 100 to 200 tons. Take these small amounts, scattered throughout the country, and in the aggregate their sum is immense, and it is from these supplies that the country has been subsisting during the past four months, and to this fact may be accredited the partial failure of a famine which almost everybody apprehended. Also, many manufactories who, in consequence of the extreme dullness of business, found it unprofitable to continue operations, and others that were compelled to stop, were left with a supply of fuel on hand. This, while the article was purchasable at $4 to $5 per ton, remained untouched and forgotten; but, as soon as $10 to $12 was spoken of as the price, it soon found a way to a neighbor in want, or, perhaps, to the original dealer who supplied it.

The country is now, however, gradually coming to an end of these supplies, and soon, unless operations in the mines are commenced, a dearth in fuel, except among those who have adopted the Cumberland coals, will be the result. But we apprehend that we are nearing a solution of the difficulties in our coal mining regions. The actual cause will soon, in fact, no longer exist. The stock will have become so depleted that a resuming of work will not send prices back to what they were when the trouble commenced, and the margin will be sufficient to pay a fair profit to all concerned, and, it is probable, the thorough purging that the trade has had, will preclude the necessity for another suspension, perhaps, for years to come. Dealers must acknowledge that the status of the wholesale and retail trade has been greatly improved by this suspension. Many that were in fact insolvent prior to the suspension have become sound and reliable by the advance in prices, and the realization of a large profit. At the opening of business many will be found prompt in their payments, that were previously proverbially slow, and the general tone and health of the trade will be found to have improved. Thus the old adage "that it's an ill wind that blows nobody any good," is again verified.

Somebody, however, must have suffered by this suspension? it will be remarked. Yes, the operator who has been compelled to remain idle with necessary expenses running on; the railroad companies with their immense accruing interest on capital and debts, and the poor miner and laborer, have been the sufferers, but all these were parties to and instigators of the strike, and the sympathies of the public will not be exhausted on any of them. Another class has also suffered, the consumers, particularly the poorer classes. They, however, enjoyed cheap fuel for a long period, and will again, and the average will not be so bad. In our last issue we gave telegraphic information of an outbreak in the Scranton coal district. We are happy to say that order has been established, and that the difficulty was not of the magnitude at first reported. We think that there has never been a better behaved set of men than those now idle in the coal regions. Many of them, no doubt, are much in want, and idleness, it is well known, begets mischief. The Miners and Laborers' Association seems to have good control of their members, and the trouble that has been caused from time to time, has come from miners outside of that organization. We are sorry that we cannot state that we are approaching the end of this suspension, or that the beginning of the end is in view, but there really seems to be no ground for such felicitation. All parties are moving cautiously, as well they may, for the question to be now settled is not only very delicate, involving the most vital interests of all concerned, but it is most intricate and badly snarled. Arbitration will alone unravel it.

PRICES.—Cumberland Coal is coming to the market in good quantities, and is rapidly taken at from $6 75 to $7 25, on board.

ANTHRACITE COAL.—What little coal is coming to market is selling at low rates, considering the uncertainty as to a future supply. We quote Wilkesbarre Steamer, Broken, and Egg, $9 50; Stove, $10 @ $10 50; Chestnut, $8 50. Lump coal is very scarce, and Lehigh is worth $11. The trade doing is from the East and city dealers, who are buying small lots to keep up an assortment.

FREIGHTS.—There is so little shipping that it seems hardly necessary to make quotations.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending April 8, 1871, compared with week ending April 9, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	25,191	771 657	11,903	634,747
†Schuylkill Canal	6,9:0	14,786	5,475	45,510
Lehigh Valley R. R.	62,190	839.09	10,637	406.071
Lehigh & Sus. R. R....	17,126	220.977	12,458	89,734
†Lehigh Canal....	5,805	6,354	....	....
Scranton North.....	10,978	168.462	....	....
" South	36,055	445.093	....	....
Penn. Coal Co., rail...	21,543	246,634	89	3,535
" " canal..	....	....	....	....
Del. & Hud. Canal Co..	8,640	8,640	....	....
" " East..	10,353	133.079	1,451	51,511
" " West	1,864	24,997	....	12,720
South.....	8,599	68,243	....	....
Shamokin.....	4,805	72,539	....	112,924
Trevorton.....	2,603	67,760	....	....
Lykens Valley Coal Co..	72	72	2,045	14,634
Wyoming South.....	....	....	....	....
Wyoming North.....	....	....	....	....
P. N. Y. C. & R. R. Co.	5,944	81,493	123	34,941
Williamstown Co'y....	6,268	62,917	....	....
Big Lick Col....	473	473	2,889	22,845
Total.....	235,257	3 251 271	47,070	1,429,072
1870.....	47,070	1,429,172		
Decrease week and year	188,187	1,822,199		

* Less coal transported for Company's use and Bituminous coal.
† Closed for the season.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending April, 8, 1871, compared with week ending April 9, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
R. & O. R. R.....	....	59,604	35,081	305,473
C. & O. Canal.....	....	....	24.069	90.246
H. & B. T. R. R.....	7,285	66,016	8,433	82,138
Harrisburg & D.....	11,460	124,145	23,124	170.579
L. V. R. R.....	....	4,292		12,734
P. & N.Y.C. & R. Co.	3,787	55,907	4,385	75,974
Total				

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, April 8, 1871:

	Tons. Cwt.
From St. Clair	
" Port Carbon	742 11
" Pottsville	300 05
" Schuylkill Haven	660 06
" Auburn	2,122 09
" Port Clinton	8,075 10
" Allentown and Alburtis	
" Harrisburgh and Dauphin	23,124 02
Total paying freight	35,026 33
Coal for Company's use	4,938 08
Total for week	39,964 11
Previously this year	721,.85 06
Total	760,6 9 17
To same time last year	968,820 02

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, April 8, 1871.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	1,2:3 00
" Port Clinton	4,262 00
Total for week	5,475 00
Previously this year	40,035 17
Total	45,510 17
To same time last year	43,875 16

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, April 8, 1871.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB VAL. BRANCH.

	Tons.	Cwt.
From St. Clair		
" Port Carbon	742	11
" Pottsville	300	05
" Schuylkill Haven	660	06
" Pine Grove	1,093	17
" Tamaqua	7,507	16
" Harrisburg	175	13
" Dauphin	8,413	12
Total	18,894	00

FOR SHIPMENT BY CANAL.

Passing Frackville Scales		
" Mill Creek "		
" Schuylkill Valley Scales		
" Mt. Carbon "	194	04
" Cressona "	1,892	05
" Pine Grove "		
" Tamaqua "	3,167	16
Total	5,254	05

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2 147	17
" Shamokin	7,387	19
" Herndon		
Total	9,530	16

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuykill & Susquehanna R. R.	506	05
" Lebanon & Pine Grove Branch	356	15
Total	903	00

CONSUMED ON LATERALS.

From Frackville Scales	8	11
" Mill Creek "	204	18
" Schuylkill Valley Scales	459	15
" Mt. Carbon "	319	15
" Cressona "	99	18
" Pine Grove "	126	16
" Tamaqua "	104	04
" Shamokin "		
" Trevorton "		
Total	1,323	17

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.		
" " Alburtis, " "	4	19
" " Plymouth R. R., G. & N. Br.		
" " Connecting R. R.		
" " Willow Street R. R.		
Total	4	19

BITUMINOUS.

From Harrisburg	14,534	17
" Connecting R. R., G. & N. Br.		
" Junction R. R.	145	00
Total	14,679	17

COAL FOR COMPANY'S USE.

Anthracite	3,955	01
Bituminous	282	03
Total.	4,237	04

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val Branch	18.894 00	17,903 09	i990 12
For Shipment by Canal	5,254 05	2,241 07	i3,012 18
Shipped Westward via Northern Central R. R.	9,530 13	1,816 17	i7,713 19
Shipped West or South from Pine Grove	903 00	352 04	i550 16
Consumed on Laterals	1,323 17	1,534 16	d 210 19
Lehigh and Wyoming Coal	4 19	656 00	d 651 01
Total Anthracite paying fr'gt	35,910 17	24,504 12	i11,406 05
Bituminous	14,679 17	9,031 10	i 5,648 07
Total of all kinds paying fr'gt	50,590 14	33,536 02	i17,054 12
Coal for Company's use	4,237 04	794 02	i 3,443 02
Total Tonnage for Week	54,827 18	34,330 04	i20,497 14
Since Dec. 1, 1870	902,323 15	1073670 03	d171346 08
Total to date	957,151 13	1108000 07	d150848 14

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	1,213 00	6,462 14	d5,249 14
" Port Clinton	4,262 00		i 4,262 00
Total Tonnage per Week	5,475 00	6,462 14	d 987 14
Since Dec. 1, 1870	40,035 17	44,747 04	d4,711 07
Total to date	45,510 17	51,209 18	d5,699 01

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending April 8, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	229 16	72,114 08
" Hazleton	1,833 11	211,840 01
" Upper Lehigh		442 06
" Beaver Meadow		75,212 13
" Mahanoy	9,013 17	110,289 01
" Mauch Chunk	128 02	2,012 03
Total Anthracite	11,265 06	471,910 12
Bituminous Coal from all sources		12,734 00
Total by rail and canal	11,265 06	484,644 12
Same time last year	73,165 04	977,169 14
Increase		
Decrease	61,899 18	493,125 02
Forwarded East from M'h Chunk by rail	10,637 13	406,071 16
Same time last year	62,190 08	859,090 19
Increase		
Decrease	51,552 15	453,019 03

RECAPITULATION.

Forwarded East from M'h Chunk by rail	10,637 13	406,071 16
To N. C. R. R., at Mount Carmel		18 00
Forwarded North from L. & B. Junction	123 10	34,897 00
To L. & S. R. R. at Packerton for rail	14 13	2,253 14
Delivered at M'h Chunk		393 15
Delivered on line of road above Mauch Chunk	77 10	3,608 11
Delivered above M. Chunk for use of L. V. R.R.	412 00	14,959 18
To L. & S. R.R., at P'n Hav., for railroad		94 10
Do. for canal		7,060 19
At M. Chunk for canal		2,552 09
Total Anthracite	11,265 06	471,910 12
Bituminous Coal		12,734 00
Total all kinds	11,265 06	484,644 12

Report of Coal forwarded by Pa. & N. Y. R. R. Co., for week ending April 8, 1871.

	BITUMINOUS. Tons.	Cwt.	ANTHRACITE. Tons.	Cwt.
By Rail	4,285 05		123 10	
Previously this year	71,561 15		34.8.8 04	
Total by Rail	.....		.....	
By Canal	.....		.....	
Previously this year	.....		.....	
Total by Canal	.....		.....	
Total for the year	75,947 00		34,941 14	
To the same time last year	55,907 00		81,493 03	
Increase	20,040 00		446,551 09	

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending April 8, 1871-Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871.. tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	13889 18	22906 18	78849 00	219539 19
Upper Lehigh Region		3936 10	4614 06	18722 02
Beaver Meadow Region		1476 18		1855 05
Hazleton Region	85 01	2308 07	1120 17	4584 16
Mahanoy Region			1043 03	
Tresckow Region	576 04		19093 04	30089 18
Mauch Chunk Region				
Totals	14551 03	30228 13	104725 10	274762 00
Increase				
Decrease	15677 10		170036 10	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	12458 06	17126 17	89734 14	220977 13
Forwarded East of Mch Chunk by Canal		5805 13		6354 04
Delivered at and above Mauch Chunk	1954 15	1'32 05 5313 18	12596 02	9546 13
Delivered to L. & B. R. R.at Plymouth Bridge	128 02	950 00	2394 14	31800 02 6083 08
L. V. R. R. at Packer'n				
Totals	14551 03	30228 13	104725 10	274762 00
Of the above there was transported on acc'nt of L. C. & N. Co.	576 04	1344 03	20334 11	47245 00
W.-B. C. & I. Co.	17226 16	8372 05	60483 01	82308 06
Totals	12803 00	9716 08	80817 12	125153 06
Increase	3086 12			
Decrease			44335 14	

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending April 8, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal	1,451 00	51,511 00
By Railroad East		12,720 00
" West		
" South		
TOTAL TONS,	1,451 00	64,231 00
For the same period last year.		
By Del. and Hud. Canal	8,640 00	8,640 00
By Railroad East	10,353 00	133.079 00
" West	1,864 00	24,997 00
" South	8,599 00	68,243 00
TOTAL TONS,	29,456 00	234,959 00

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending April 8, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	89 14	3,535 04	21,543 09	246,634 14
" Canal				
Total	89 14	3,535 04	21,543 09	246,634 14

Decrease 243,099 10 tons.

Shipments of Cumberland Coal

for the week ending Saturday, April 8, and for the year 1871:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M.	.....	.....	.....
Borden	2,900 00	2,231 18	5,131 18
Consolidation	6,769 05	6,928 19	13,698 04
Spruce Hill	863 11	.....	863 11
Midlothian	1,339 02	1,553 09	2,892 11
H. and Baltimore	39 09	1,126 00	1,165 09
do Va M	2,040 14	.....	2,040 14
V C & I Co	.....	.....	.....
G. C. C. and I.	3,063 03	1,338 03	4,401 06
Big Vein	2,858 16	.....	2,858 10
Maryland	5,576 16	6,783 15	10,360 11
American	2,269 15	4,106 19	6,403 14
Atlantic	1,[illegible] 03	.....	1,598 03
Piedmont	1,909 15	.....	1,909 15
Swanton	1,268 00	.....	1,268 00
Barton	840 00	.....	840 00
Potomac	1,518 10	.....	1,518 10
George's Creek M. C.	.....	.....	.....
Franklin	2,139 09	.....	2,139 09
Total week	35,081 02	24,069 03	59,150 05
Previous	270,392 02	66,177 06	336,569 08
Total year	305,473 04	90,246 09	395,719 13

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, April 15. R. A.	W. A.	AT PHILADELPHIA, April 15. R. A.	W. A.
Lump	$— —	$— —	— —	— —
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	— to —
Egg	$ 50 to $ 00	— to —	— —	— to —
Stove	9 50 to —	— to —	— —	— to —
Chestnut	8 50 to —	— to —	— —	— to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	9 00	9 00	— —	— —
Stove	10 25	10 50	— —	— —
Chestnut	9 00	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A.	8 00	— —	— —
New England	"	— —	— —	— —
Locust Dale	W. A.	7 50	— —	— —
Honey Brook, Le'h	W. A.	9 00 to 10 50	— —	— —
Spring Mountain	" "	9 00 to 10 50	— —	— —
Sugar Creek	" "	9 00 to 10 50	— —	— —
Sugar Loaf	" "	9 00 to 10 50	— —	— —
Old Comp'y's	" "	9 00 to 10 50	— —	— —
Cross Creek	" "	6 00 to 10 50	— —	— —
Room Run	" "	— —	— —	— —
Girardville	" "	— —	— —	— —
McMichael	" "	— —	— —	— —
Shamokin	" "	9 50	— —	— —
Lykens Valley	" "	— —	— —	— —
Broad Top	" "	9 50	— —	— —
Hill & Harris	" "	— —	— —	— —
Henry Clay	" "	— —	— —	— —
Powelton	" "	9 50	— —	— —

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

April, 1871.
No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	— —	— —	— —	— —	— —	— —
Pittston at Weehawken	— —	— —	— —	— —	— —	— —
Lackawana at do	— —	— —	— —	— —	— —	— —
Wilk'b're at Hoboken	— —	— —	— —	— —	— —	— —
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	— —	— —	— —	— —	— —	— —

For freights to different points see "Freights."

Prices for Coal at Mauch Chunk.

April 1871.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein..f.o.b. at Phila	$ —
Lemon " " " "	— —
Cumberland Vein Coal	— —
Consolidation Coal Co.'s on board	N. Y. 6 75
Maryland Coal Co.	" 6 75

Prices at Baltimore—April, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$— @ —
Pittston and Plymouth, do	— @ —
Shamokin Red or White Ash, do	— @ —
Lykens Valley Red Ash, do	— @ —
Zerba Valley	— @ —
Treverton	— @ —
By retail, all kinds per ton of 2240 lbs.	— @ —
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@4 85
Fairmont and Clarksburg gas, f. c. b. at L. Point	6 00@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

April, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4 30

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— @ —
Lykens Valley	— @ —
Shamokin Red or White Ash	— @ —
Trevorton and Zerba Valley	— @ —

Prices of Gas Coals.

April, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

Duty, $1 25, gold

	Coarse.	Slack.
Block House	$1 75	@75
Gowrie	1 75	@75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @- —
Despard Coal Co.	$7 50 @- —
Penn.	7 75 @8 00
Newburg Orrel Gas	— — @- —
West Fairmount Gs Coal	8 00 @- —

AT PHILADELPHIA.

Powelton	$7 75

Prices of Foreign Coals.

April, 1871.
Duty $1 25 per ton.
Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 50
" House "	— —@16 00
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.
PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Freights.—April, 1871.

TO EASTERN PORTS.	From Philada'a.	From E. Port and Port Johnston.	From Newburg....	From Rondout....
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 10	1 75		
Boston	2 10	1 85		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	2 00		
Derby	2 00	1 20		
Dighton	— —			
East Cambridge	2 35	2 00		
Fall River	2 00	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 50		
Jersey City	1 40	60		
Middletown	2 25	1 25		
Mystic	— —	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 76	1 25		
Newport	2 00	1 40		
New York	1 35	60		
Norwalk	1 80	1 00		
Norwich	2 00	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	— —	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cockaackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Sangerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

METALS.

NEW YORK, April 13, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, 7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2¼; Scrap Cast, $6; Wrought, 8 per ton,

	Store Prices.
Pig, Scotch No. 1, ℔ ton	33 00@36 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	— —@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ℔ ct.	110 00@115 00
Bar, Refined " "	77 50@ — —
Bar, Common " "	85 00@ — —
Scroll " "	— —@ — —
Ovals and half-round " "	100 00@120 —
Band " "	95 00@105 00
Horse Shoe " "	92 50@ 95 —
Rods, ¼ to 3-16 inch " "	82 50@120 —
Hoop " "	100 00@140 00
Railroad	— —@6½ —
Sheet, Russia, as to Nos. (gold)	10¼@—11
Sheet, Single, D. and T. Common	—4½@— 6
Sheet, Galv'd, Nos. 14 to 26, 9 and 12c. Nos. 27, 28, and 29, 12@14	
Rails, English (gold), ℔ ton	54 50 @59 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 16 @— 17
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	— @— 37
Copper, Old Sheathing, &c. clean	19 @— 20
Copper, Chili Pig	— @—
Copper, American Ingot	21¾@— 21¾
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¼ cents ℔ lb.

Galena, ℔ 100 lbs	$— @— —
Spanish (gold)	6 15 @6 20
German, do.	6 15 @6 20
English, do.	6 20 @6 50
Bar (net)	— — @8 75
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	@—38½
Straits	34 @33¼
English	32¾@33

PLATES.	Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 37	@8 50	$— —@— —
I. C. Coke	7 25	@7 75	8 37½@ 8 75
Coke Terne	6 25	@7 25	7 25 @ 8 25
Charcoal Terne	7 25	@8 25	— — @— —

REMARKS.

IRON.—The market for Scotch pig is stronger. The demand is moderate; 500 tons, to arrive, sold on private terms. We quote Glengarnock at $33@34; Eglantine, $33@33 50. American is quet; 400 tons No. 1, in lots, sold at $35; 150 tons old rails sold on private terms. Russia sheet quiet at 10½c.' gold. Rails are dull at $55@56, gold, for English, and $63@70, currency, for American.

TIN.—Pig tin is more steadily held, with a moderate trade; 460 slabs sold at 33c., gold. English quoted at 32½@33c., gold. Plates show no further change. The demand is fair. Sales embrace 500 boxes I. C. charcoal at $8 50, gold, and 600 boxes charcoal terne at $7 37½, gold. We quote best brands I. C. charcoal at $8 50, gold; good do., $8 37½@8 50, do.; ordinary do., $8 25@8 37½, do. Coke, 10x14, $7 37½, gold; 14x20, $7 62½, do.; low grade 10x14, $7, do.; 14x20, $7 25, do. Charcoal terne, $7 25@8 25, gold. Coke terne, $5 87½@7, gold.

COPPER.—Manufacturers have been in the market for parcels to a fair extent at easy figures. About 250,000 lbs. were picked up at 21½@21¾c. New sheating, 30c.; bolts and braziers, 32c.

LEAD.—Foreign is quiet at about steady prices; 50 tons sold on private terms. We quote ordinary at $6 15@6 20, gold; pipe and sheet, 10¼c.; bar, 8¾c.

ZINC.—American Ox. Zinc, 6¾@7c.; French Ox. Zinc, 10@10½c; Sheet Zinc, 8¾@9¼c.; Manganese, 4¼c@5c.

Mining Stocks.

NEW YORK, April 13, 1871.

The following quotations are reported by the New York mining stock board:—

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	20	30
Bennehoff Run	20	—
Blood Farm	—	—
Breevoort	30	50
Bliven Oil	30	50
Buchanan Farm	35	—
Central	70	75
Clinton	50	—
Home	150	—
Phillips Pet	10	—
Rynd Farm	35	40
United Petroleum Farms	23	25
United States	60	75
National	—	—
New York & Allegheney	35	—
Northern Light	—	—
Pithole Creek	65	—
Rathbone Oil	30	—
Second National	—	—
Sherman & B	—	—
Tarr Farm	—	—

GOLD STOCKS.

	BID.	ASKED.
Bates & Baxter	25	35
Benton	3	7
Black Hawk	31	50
Central Gold	12	15
Cons Gregory	48	58
Grass Valley	13	—
Gunnell	13	15
La Crosse	—	—
Liberty	—	—
Montana	3	—
Rocky Mount	3	—
Quartz Hill	16	25
Smith & Parmlee	40	40
N. Y. & Eldorado	—	—
American Flunk	10	14

San Francisco Stock Market.

A telegram from San Francisco April 11, quotes mining stocks as follows:—

Savage	60
Yellow Jacket	66⅛
Kentuck	75
Chollar Potosi	74½
Gould & Curry	64
Belcher	52
Imperial	33
Amazon	350
Crown Point	164
Hale & Norcross	—

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square		$6 50@	7 00
" green, 1st " "		6 50@	7 00
" red, 1st " "		15 00@	16 00
" variegated, " "		5 75@	6 20
d. b'k and d'k blue, 1st qual., "		6 00@	7 05

PRICES OF ROOFING SLATE LOADED ON THE CARS AT POULTNEY.

Red,	per square	$7 00 @	$11 00
Purple,	" "	4 50 @	5 00
Best q'l. Unf'g. Gr'n.	" "	4 50 @	5 00
Gr'n. or Vargtd.	" "	3 25 @	4 25

PENNSYLVANIA SLATE TRADE.

The following is a weekly statement of Roofing Slates, School Slates and Mantels, shipped from Slatington, via Lehigh Valley Railroad for last week, ending April 8, 1871.

ROOFING SLATE.

Girard Slate Co	— squares.
D. Williams & Co	53 "
J. Anthony	— "
Lehigh Slate Co	— "
American Slate Co	— "
H. Williams	70 "
W. R. Williams	— "
Blue Vein Slate Co	— "
Columbia Slate Co	105 "
Saylor & Morgan	35 "
Kuntz & Wooding	53 "
Jones & Williams	105 "
Total	421 "

SCHOOL SLATE.

D. Williams	40 cases.
Locke Slate Co	6 "
Lehigh Slate Co	28 "
F. Shenton	— "
Harper & Cortright	— "
A. W. Lerch	11 "
H. W. Harper	1 "
Total	86 "

MANTELS.

Yerkes & Martin	— "
Lehigh Slate Co	28 "
Total	28 "

BLACK BOARDS.

Lehigh Slate Co	— "
Total	— "

BY THE L. S. RAILROAD.

SCHOOL SLATES.

Heimbach Slate Co	35 "
Twin City Slate Co	70 "

MANTELS.

Heimbach Slate Co	10 "

BLACKBOARDS.

Heimbach Slate Co	2 "

SLAB STONES.

Lehigh Slate Co	3 "

FLAGGING.

Heimbach Slate Co	2 Tons.

FROM TREICHLER'S STATION.

Eagle Slate Co	210 squares.
Thomas Beck & Co	8 "
Eagle Slate Co	735 "
Thomar W. Parry	140 "
Continental Slate Co	35 "

COAL SHIPPERS.

WHITE, FOWLER & SNOW.

Wilkesbarre and Lehigh Coal,
FOR STEAM AND FAMILY USE.
OFFICE
Room No. 75, 111 BROADWAY, (Trinity Building).
JNO. WHITE,
LINDLEY H. FOWLER,
jan1-1y LOUIS T. SNOW.

THE NEWBURGH ORREL COAL COMPANY.
Mines at Newburgh, Preston Co., W. Va.
Company's Office, No. 52 S. Gay St. Baltimore, Md.
C. OLIVER O'DONNELL.....President.
CHAS. MACKALL.....Secretary
This Company offer their very superior Gas Coal at lowest market prices.
It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.
It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.
The best dry coals shipped, and the promptest attention given to orders. sep21-1y

RANDOLPH BROTHERS, Sole Agents of the original
Spring Mountain Lehigh Coal.
Extensively used for Smelting Iron.
☞Rooms, 28 and 30 Trinity Building,
pr6tf NEW YORK.

WILKESBARRE COAL, DELIVERED DIRECT from the Mines of
The Wilkesbarre Coal and Iron Co.,
or for re-shipment at
HOBOKEN AND JERSEY CITY.
OFFICE:
ap1-1y 80 Broadway, New York.

THE DESPARD COAL COMPANY OFFER their Superior DESPARD COAL to Gas Light Companies throughout the country.
MINES IN HARRISON COUNTY, West Virginia.
Wharves, Locust Point, } Baltimore.
Company's Office, No. 29 South st. }
AGENTS:
PARMELE BROTHERS, No. 32 Pine street, New York.
BANGS & HORTON, No. 31 Doane street, Boston.
Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.
☞ Reference to them is requested. may30-1y

LEWIS AUDENRIED & CO., MINERS AND Shippers of the following celebrated
ANTHRACITE COALS.
From Philadelphia and the Mines,
DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash; Old Company's Lehigh; Wilkesbarre.
From Port Johnston and Jersey City,
Old Co.'s Lehigh, Hazleton, Wilkesbarre, and Shenandoah Coals.
Also the superior CUMBERLAND COALS.

BROAD TOP,	BARTON,	BARTON,
SEMI-BITUMINOUS,	GEORGES CREEK,	GEORGES CREEK,
at Philadelphia.	at Baltimore.	at Alexrndria.

205 Walnut street, Philadelphia; 14 Kilby street, Boston, 34 Westminster st., Providence; 24 Second st., Baltimore, 110 BROADWAY, NEW YORK. Jan13.y

G. B. LINDERMAN & CO.,
MINERS,
Sugar Loaf, Lehigh Coal.
OFFICE, 50 TRINITY BUILDING, 111 BROADWAY
may23-1y NEW YORK.

COXE BRO.'S & CO., CROSS CREEK COLLIERY Miners and Shippers of the Celebrated
Cross Creek Free Burning Lehigh Red Ash COAL.
FROM THE BUCK MOUNTAIN VEIN.
OFFICES;
Philadelphia, No. 341 Walnut street.
Drifton, Jeddo P. O., Luzerne Co., Pa.
Agent in New York, SAMUEL BONNELL, Jr.,
Room 43, Trinity Building,
feb-1y 111 Broadway.

SAMUEL BONNELL, JR., OFFERS FOR SALE his SUGAR CREEK and HONEY BROOK
LEHIGH COALS,
OFFICE:
43 and 45 TRINITY BUILDING, 111 BROADWAY,
NEW YORK. Jan:1y

Four First Premiums, American Institute, 1870.
THE ALLEN ENGINE WORKS,
Fourth Av. and 130th and 131st Streets,
New York City.
MANUFACTURERS OF
THE ALLEN ENGINE
PORTER'S GOVERNOR,
The Allen Boiler, and
STANDARD STRAIGHT-EDGES,
Surface-Plates, and Angle-Plates.
Four First Premiums awarded at the Fair of the American Institute, 1870.
Send for an Illustrated Circular.

HORTON AND MABIE
PEEKSKILL, NEW-YORK.
Fire Brick Works.
MANUFACTURERS OF ALL SHAPES OF
FIRE BRICK
FOR IRON WORKS, LIME KILNS, FANNERS, &c., &c., &c.
Particular attention given to the manufacture of linings for Cupola Furnaces.
Blocks and Tiles for all Purposes.
BRASS FURNACE CIRCULARS.
Stove and Range Linings of every description to order.

MISCELLANEOUS.

DEPARTMENT OF PUBLIC WORKS
237 BROADWAY.
TO CONTRACTORS.

Proposals, enclosed in a sealed envelope, with the title of the work and the name of the bidder indorsed thereon, will be received at this office until TUESDAY, April 18, at 11 o'clock A. M.

No. 1. For paving Hudson street, from Chambers to Canal street, with Belgian pavement.

No. 2. For paving Hoboken street, from Washington to West street, with Belgian pavement.

No. 3. For paving Reade street, from Washington to West street, with Belgian pavement.

No. 4. For paving South street, from Montgomery to Corlears street, with Belgium pavement.

No. 5. For paving Mangin street, from Houston to Stanton street, with Belgian pavement.

No. 6. For paving Corlears street, from South to Water street, with Belgian pavement.

No. 7. For sewer outlet in One Hundred and Tenth street, from Harlem River to Fifth avenue, to One Hundred and Sixteenth street, to Seventh avenue, and branches in Second, Fourth and Fifth avenues, One Hundred and Eleventh, One Hundred and Twelfth, One Hundred and Thirteenth, and One Hundred and Twentieth streets.

No. 8. For sewer in One Hundred and Ninth street, between Fourth avenue and Harlem River.

No. 9. For sewer in Second avenue, between One Hundred and Eleventh and One Hundred and Sixteenth streets, One Hundred and Fifteenth street, between First and Third avenues, and One Hundred and Twenty-seventh street, between Second and Third avenues.

No. 10. For sewer in Tenth avenue, between Manhattan and Lawrence street, and Lawrence street, between Tenth avenue and One Hundred and Twenty-ninth street.

No. 11. For sewer in Third avenue, between Eleventh and Twelfth streets.

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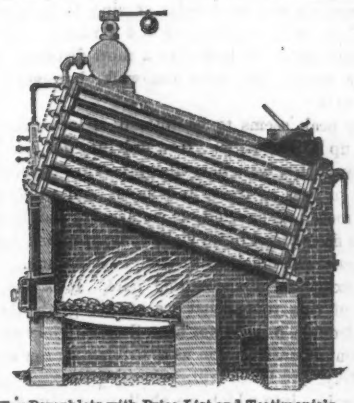

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The Ascent of Gray's Peak.

By R. W. RAYMOND.

[CONTINUED FROM PAGE 232.]

The summit is close before us now, glistening with patches of snow. On the neck, between Gray and Irwin, there is a regular turn-over collar of a drift. It looks small enough here; but you couldn't pass it without a twenty-foot tunnel in the snow. There's not much life up here: scarcely even a mountain goat or a snow quail, for a six-hundred-dollar breakfast. Bill, here, will tell you that story: he hasn't opened his mouth the whole way.

"Well, 'taint much of a story, but it gives the Georgetown boys the dead-wood on Dick Irwin and me, and they hain't let up on us yet, nor won't s'long's they kin git any body to swop lies with 'em. However, this yer's no lie. Ye see Dick and me—that thar mountain was named after Dick—that is to say, these two was ary one Irwin's Peak, and whichary wasn't Irwin's was Gray's, and nobody knowed. Gray, he was a great weed-sharp, down East somewhar, and he gin so many names to this yer bunch-grass and stuff that they thought they'd gin his name to the highest peak, though I don't see it myself. So these scientific fellers kept a-comin' up here, and a-measurin', and they couldn't agree. Some on 'em biled water on the top, and some on 'em friz mercury, but they couldn't agree. So, at last, a lot on 'em, fresh from college, camped out all night right on the top of Gray's, and took observations, you bet, every five minutes, and when *they* came down there wasn't no manner of doubt in *their* minds but what Gray's was the highest peak in the whole fandango. So Dick, he come down like a gentleman, and took the next best himself. Well, Dick and me was out hunting and looking up blossom-quartz around yer, and we raised one of these yer white snow-quails, and I found the nest with six eggs into it. So says I to Dick, you jest hold on, and we'll have a regular Delmonico sockdologer. And we fried them there eggs, and eat 'em; and Dick said, bust his crust if he had ever had a breakfast set so comfortable-like as that one did. All we want, says Dick, is a drop of whisky to wash it down. So we went down to Bakerville, and was a-settin' round in the bar-room as sociable as you please, spittin' on the stove, when Dick happened to mention them snow-quails' eggs; and a long, slab-sided scientific son of a gun, with spectacles, riz up like a derrick, and, says he: 'My friend, the Smithsonian Institution has offered a reward of one hundred dollars for a single specimen of the snow-quail's egg!' Most anybody would a-stopped to swear and have a drink on that, but it never was nothing but an idee and a start with Dick Irwin. When he thought of a thing he was going to do it, sure; and this time he made just two jumps out of doors, and moseyed up the mountain, with his rifle. Afore we saw him again, he had been away down on the Grand, and all through the Snowy and the Wasatch. Then we heer'd on him in the Middle Park; and one day he walked over the range, and into the bar-room at Bakerville, as if nothin' had happened, and, says he, boys, that six-hundred-dollar breakfast has used up the last snow-quail's egg in the whole damn Rockies. What'll you take?"

Not so well told, Bill, as when first you reeled it off to me, under the shadow of McClellan. However, this expurgated version, though not so good for your reputation as a *raconteur*, is doubtless better for your soul.

We have reclined on a sunny bit of grass, letting our horses nibble their luncheon, while we disposed of our own—Bill's employment as a story-teller serving to keep him down to a fair share of the sandwiches and sardines. Now, let us scale the final peak. It looks but a short distance, yet it is a good hour's work. You need not walk, however; the horses are used to it.

The peak seems to be formed of loose fragments of rock, piled up in confusion. How did they get here? They didn't get here: they were here always. This heap of stones is the effect of ages of frost, and snow, and wind upon the once solid rock. At our left, as we ascend, stands a solitary crag, which has not yet quite yielded, nor toppled into ruins. But is seamed and cracked, through and through.

No extensive prospect from here. It is one of the advantages of this route, that we mount gradually, and without great trouble, yet do not have the final glory of the view from the summit wasted upon us in driblets by the way. McClellan, and Gray, and Irwin still rise solidly between us and the land of promise, into which we shall presently gaze. There are snow-drifts, here and there, but not enough to trouble us. The trail goes back and forward, winding sharply among the rocks. We have not yet risen above all life: there are tracks of light-footed animals in the snow—and, yonder, as I live, there is one more mine. Yes, the Atlantic and Pacific Lode sits astride the backbone of the Continent; and the enthusiastic discoverer, sure of having found, at last, the argentiferous heart of the continent, has put down a shaft, exactly on the divide! Pity, that a location so admirable for drainage and ventilation should have to be abandoned "for lack of capital." We must wait for the C. P. to come this way.

But, the last turn and the last snow-drift being passed, we stand, at last, on the summit of Gray's Peak. It is a place for deep breaths of delight and admiration, but not for words—at least not until the first ecstasy of silence being passed, the inevitable member of the party who carries the opera-glass, and who knows all the geography of the scene, begins to dispense his information. Never mind him. He is a good fellow; but he has been here before, and you have not. Hear what he has to say, and then sit on a rock beyond ear-shot, and look for yourself.

Southward, the crowding summits of the range, intersected by the deep *cañons* of the Platte and its tributaries, and, beyond all, Pike's Peak, superb in the sun.

Westward, sweeping the circle from the south, the South and Middle Parks, pieces of the plains, caught and half-lifted by the mountains, in the midst of which their broad, fair surfaces lie embosomed; the dark, tiny *cañons* of the Blue and other streams, that hasten to join the great south-western system of waters. One of them is full of clinging smoke; the woods are afire for miles. Far beyond the Parks is the Snowy Range, and the lofty peak of Mount Lincoln. Down in this labyrinth of glades, cliffs, and gorges, emerald lakes, and rushing streams, there are human beings living and laboring, digging and sluicing, blasting and crushing, scalping or being scalped—for the Arraphoes make a dash at the Utes or the Whites, now and then, in the Middle Park—but we reck nothing of it all. We might imagine ourselves to be the first who were looking on the fair expanse, but for this piece of the New York *Herald* and this old sardine-box, left by a former party, and the minute cluster of dots in one of those far *cañons*, which closer inspection reveals to be the town of Montezuma.

Northward, infinite variety of battlements, spires, domes, and whatever other thing you choose to name, by way of dwarfing the sublimity you cannot describe—innumerable vistas and half-revelations, Irwin's Peak in the foreground, looming up on a level with us, so near, apparently, that one might throw a stone to its lone flag-staff and skeleton of a tent; Long's Peak closing the view in the distance, brown and cloud-hung.

Eastward, another turn of the marvellous kaleidoscope, and a new combination of the endless beauties of outline, tint, and shade; and, beyond all, ending and blending in the illimitable sky, the vast ocean of the Plains.

Upward, the empty heavens, speaking unutterable things; and everywhere, the thin, pure, sweet mountain-air, which one rather drinks than breathes, feeling the while that intoxicating combination of inspiring stimulus and delicious languor which nothing else bestows.

It takes a good while to go up to Gray's Peak, but mark how short a tale shall put you down! A climb down the steep summit, leading the horses; a brisk ride, with gallops interspersed, down the valley, through deepening twilight, and at last beneath the glamour of a full, white moon—Georgetown—Denver—C. P. R. R.

(Inquiring old lady in the cars): "Can you tell me, my dear, which is Gray's Peak?"

(Fair Reader—late my companion): "That is it, yonder; I was on the top of it yesterday."—*Overland Monthly.*

Preparation of Pure Silver.

When a chemist or metallurgist wishes to obtain pure silver from a silver coin or any other silver alloy, he first dissolves the alloy in nitric acid, and precipitates the silver from the filtered solution, by the aid of chloride of sodium (common salt) or by hydrochloric acid. The chloride of silver thus obtained, well washed and dried, is smelted in a crucible with a proper addition of chalk and charcoal, both pulverized. In operating carefully almost pure silver is thus obtained; but on a larger scale, where economy is sought, the way of proceeding is different. The silver ingot, containing generally copper and lead, is dissolved in concentrated sulphuric acid, heated to such a temperature as to allow the sulphuric acid to act upon the silver in evolving sulphurous acid and yielding sulphate of silver. From this part of the process begins the improvement referred to in the article.

Let us suppose that 30 kilogrammes of silver have been thus dissolved, and that while the solution is still warm it is poured in an acid bath prepared thus: 140 to 150 litres sulphuric acid at 58° Baume, and heated to 130° Centigrade; after having thoroughly stirred the whole the sulphate of lead is allowed to settle, and the clear liquid is decanted from it while warm and allowed to cool for 24 hours. During this time, varying according to the weather, the sulphate of silver has settled in small pure crystals; they are collected either by decantation or filtration to be further submitted to the following reduction: In another vessel sulphate of protoxide of iron has been dissolved in water in proportions sufficient to have a liquor of 15° to 30° Baume, according to the degree, from 140 to 560 litres of this sufficiently heated liquor is taken, and the above quantity of sulphate of silver is thrown into it. After a thorough stirring the whole is allowed to cool and to rest. By a double decomposition a sulphate of sesquioxide of iron is formed, $Fe_2 O_3\ 3\ So_3$, and metallic silver in a fine precipitate and very pure. This fine metallic precipitated silver is collected by decantation or filtration, is washed, dried and smelted in a crucible so as to obtain a pure silver ingot. We may further add that both acid baths can be used over again by adding to them the suitable quantity of acid to restore them to their degree, or, if it is sufficiently concentrated, it can be used to dissolve the ingot of silver alloy.

The sulphate of iron bath can also be brought back to the state of sulphate of protoxide in allowing finely divided iron to boil in it.

On the whole, the improvement consists in the fact that the sulphate of silver is soluble in sulphuric acid at 50 to 60 degrees and heated at 100° to 200° Centigrade, and crystallizes in the most extraordinary way by cooling the solution.—*Journal of Applied Chemistry.*

Mining Interests of New Jersey.

Over 600,000 tons of iron ore are mined yearly in Morris county besides what is obtained from the adjoining counties. The average market price of this is $6 per ton, amounting to $3,000,000 per annum. The great portion of the ore is transported by rail to the Lehigh Valley, and there manufactured into pig and refined iron, ready for market use. The most famous mines of Morris county are those in the vicinity of Hibernia, Mount Hope, Mine Hill and Chester. These are in one continuous range, following the strata of the granite rock, on a course northeast and southwest. Some of these mines have been worked since the Revolution, and are now in depth from 300 to 700 feet and still hold their own at the bottom, the supply being apparently inexhaustible. Scarcely a mine in Morris county has proved a failure, but the owners have generally amassed fortunes, while in many other localities they have proved more or less uncertain. We understand that a company of Newark gentlemen is forming to work a mine at Meriden, which was recently discovered by a gentleman of that city, and which, from all appearance, will prove to be a valuable mine.—*The Jerseyman.*

The American Institute of Architects.

The New York Chapter of the American Institute of Architects have just commenced an experimental series of lectures upon architectural subjects. Every Monday evening, at 8 P.M., Mr. P. B. Wight, will lecture on Architecture, its History and Æsthetics, every Wednesday evening, at 8 P. M., Mr. R. G. Hatfield, on Architecture and Construction. The series will close on the 31st of May.

The first lecture of the course by Mr. Wight took up the subject of ethnology, as showing the capacity of races for the production of art. He next took up the historical account of Egypt and the architecture of that period. The third lecture was devoted to the analysis of Egyptian architecture, showing its details and motives.

The lecture on Monday, April 8, was devoted to the Architecture of Ancient Persia, showing the Egyptian influence upon it. The more important remains were noticed, and illustrative details of construction were explained. The especial object of this course is to furnish such information upon the subject as is not to be readily obtained from other sources by young men who are studying architecture. The method is to compare as far as may be the architecture of all nations during the period under consideration, thus following the subject chronologically rather than according to style or nationality. This plan has the advantage of giving a wider view of the subject than the other, while it is more easily comprehended and remembered.

The Wednesday evening lectures by Mr. Hatfield upon architectural construction are elementary, and designed especially for students. The fee for the course which includes both series is ten dollars.

Untimely Fate of an Inventor.

Charles Dorfis, the inventor of a new explosive said to possess from ten to twenty times the effectiveness of ordinary gunpowder, together with a spectator of his experiments and a carpet-bag full of the new compound, were blown up recently in Pennsylvania. Some difficulty being experienced in getting the tin cartridge containing the explosive into the hole, in which it was intended to test its efficacy, Mr. Dorfis attempted to push it down with a stick, when an explosion resulted which killed Dorfis and McNulty. The editor of the *U. S. R. R. and Mining Register*, in commenting upon the occurrence, says that only a short time since he in company with Dr. Genth and another gentleman carefully inspected the loading and firing of a hole at a quarry near Philadelphia, by the same experimenter. He describes the explosive force of the compound, as shown by the way in which the rock was torn, as much greater than seemed possible from the sound produced by the explosion. Although the entire stock of the compound which Dorfis had with him was exploded, and it is doubtful whether any more of it exists in this country, a considerable supply is known to have been left at the Admiralty office in London.

A chemical analysis of the material left would doubtless show its nature, but in such a case it would perhaps be for the welfare of humanity if the secret of the manufacture, which was, we understand, jealously regarded by the inventor, were allowed to perish with him.

The Arts of Peace.

We noticed in the grand peace procession of our German fellow-citizens, which lately took place in this city, quite a large number of trucks on which were represented the different arts and trades. The idea of producing in such a pageant representations of the arts which are permanently those of peace, seemed to be remarkably appropriate, not only as typifying a striking contrast between peaceful industry and the tumult of war, but as a means of bringing the various trades and employments as a means of instruction directly before the people.

Hardly a trade was left unrepresented, while on some of the trucks workmen appeared actively engaged in their several pursuits. In the cases of one or two of the trades we noticed complete illustrations of all the materials used in them, from the first appearance of the raw material to the finished production ready for market.

Among those exhibitions which seemed deserving of attention were those of Messrs. Knowles & Sibley's steam-pumps, mounted on a handsome truck, drawn by six horses, of Messrs. B. Kreischer & Son, of this city, fire-brick manufacturers, and of Messrs. Wm. D. Andrews & Bro., steam engine builders, also of this city.

To Render Inflamable Materials Fire-proof.

A coating of a mixture of borax and sulphate of magnesia (Epsom salts), or of a mixture of sulphate of ammonia and sulphate of lime, is recommended by W. Braun Miller of Vienna, in a recently published report concerning some practical experiments with preparations for preventing the spread of fire. The author's reputation as a metallurgist and chemist is a guarantee for the correctness of his opinion and the reliability of his experiments.

THE ENGINEERING AND MINING JOURNAL.

CONTENTS FOR THIS WEEK.

[*Illustrated Articles are marked with an asterisk.**]

*Safety Boilers	241	Untimely Fate of an Inventor	248
Polytechnic Club of the American Institute	242	The Arts of Peace	248
Deep Placer Mining in California	243	To Render Inflamable Materials Fire-Proof	248
Zinc and its Compounds.—Their uses in Domestic Economy and Medicines	244	EDITORIALS:	
Disinfecting Cotton	245	The Burleigh Tunnel	249
The Definition of an Alloy	245	The Coal Strike	249
MINING SUMMARY	245	Progress of the Northern Pacific Railroad	250
MARKET REVIEW	246	Electric Fuses	250
THE SLATE TRADE	247	The Funding of the Debt	250
The Ascent of Gray's Peak	248	Eastern Oregon	250
Preparation of Pure Silver	248	Determination of Carbon in Steel	250
Mining Interests of New Jersey	248	OFFICIAL LIST OF PATENTS	250
The American Institute of Architects	248	Important to Inventors	251
		Advertisements	252

ROSSITER W. RAYMOND, Ph. D., Editor.

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The Burleigh Tunnel.

THERE is great jubilation in Clear Creek county, Colorado. The BURLEIGH tunnel, in Sherman mountain, above Georgetown, has cut a large fissure-vein of silver ore, and the event appears to be considered a wonderful thing, not only for Mr. BURLEIGH, but for the country generally, and for the proprietors of tunnel-claims in particular. We should be content to congratulate Mr. BURLEIGH (though it is rather early in the day to do that) upon what we sincerely hope may prove an adequate remuneration for his energy, perseverance and mechanical ingenuity; but the astounding conclusions which are drawn by our Colorado friends from his success, and the imminent danger of a consequent recurrence of the pernicious "tunnel-fever," which had nearly, we fancied, run its course in that neighborhood, and died out, compel us to discuss more in detail the nature and the bearings of this new discovery.

The facts are these. The BURLEIGH tunnel was run partly to explore Sherman mountain, and partly to demonstrate the effectiveness of the BURLEIGH drill, operated by compressed air. Both the drilling-machine and the air-compressors are inventions of Mr. CHARLES BURLEIGH, and have proved themselves to be good machines. It is our impression, however, that in this particular undertaking many local difficulties have combined to render the cost of excavation as great as it would have been for hand-drilling. But there is little doubt that there has been a considerable saving in time; and meanwhile the apparatus has been employed elsewhere under more favorable conditions, and has vindicated its economical superiority over hand-drilling in certain circumstances, which we will not here pause to discuss. The principal gain secured by its operations in this tunnel has been a large amount of practical experience in its use, which will be, no doubt, a benefit to the inventor and the manufacturers.

The tunnel is admitted by all who have seen it to be a fine specimen of mining work, in every respect except that of location. It was started in a spur of the hardest rock that could be found; and this added to its cost and difficulty. The demonstration that the BURLEIGH drill can successfully perforate such rock was dearly bought, and was less attractive to the mining population than an easier victory over ordinary material. In granite like that at the mouth of this tunnel there is a course more economical than the use of any drilling-machine,—namely, not to drill at all. But Mr. BURLEIGH chivalrously selected the most formidable cliff he could find, erected his machines, and pounded away. Under the circumstances, he achieved wonders of excavation; yet for a long time it seemed as if his tunnel would be but a barren monument (if a hole can be called a monument) of his mechanical skill. But at something over nine hundred feet, the character of the rock indicated the neighborhood of a vein. Irregular seams of ore occurred, and at last a large body, varying in width from sixteen to twenty inches, was encountered. Further work showed this body to be directly under the hanging-wall of the lode, which dips slightly into the mountain. The whole appearance of the crevice, which is some twelve feet wide, a remarkably well-defined selvage, visible in the roof, sole and sides of the tunnel, and a solid wall beyond the selvage, leave no doubt that this is a true fissure-vein.

The irregular seams of ore in the vein-material and the main body adjacent to the hanging-wall consist of zinc-blende, pyrites and galena, the first being largely predominant, and the amount of the latter probably not exceeding ten per cent. of the ore proper. This mixture of minerals promises a refractory ore, as the experience of the Griffith, Franklin and other mines in Clear Creek county is sufficient to show. But the size and metalliferous character of the vein invite further explorations upon it; and we have no desire to discourage the expectation that these will develop material better adapted for reduction at present prices and by present methods. Only, as we have hinted already, the processions and speeches and social drinks of our Georgetown friends seem to us a little premature, in view of the fact that the value of this discovery for actual mining is still unascertained.

The drifts on the vein will be run, it is said, by hand. The vein-stone is comparatively soft, and the readjustment of the machine-drills would involve a considerable unnecessary expense. But if the drifts reveal excellent ore in abundance, what then? Simply this: that Mr. BURLEIGH, after expending a vast amount of money to find the vein with a tunnel, will have to make a shaft after all, if he expects to extract ore economically. It will scarcely pay to keep the compressors running, in order to pump air into extensive stopes; nor will it be found advantageous to extract ore from a drift without shafting. That method of extraction is not new. It is a good deal worse than a mere untried novelty. It was condemned long ago, not only on account of difficulties in ventilation, but also because rapid and economical extraction requires that bodies of ore shall be exposed to the attacking miner in both a horizontal and a vertical direction. In working upward from a drift, a part of the stope must be kept above the rest, and it must be kept open by timbering. What is this but driving a shaft upwards in the most inconvenient and expensive way?

We do not underrate the value of the tunnel. The mine proving profitable, the tunnel will serve an excellent purpose in drainage and transportation. When it is properly connected with a shaft to the surface, the works will be much better than if there were no tunnel. But how many hundred thousand dollars better? Not so many as the tunnel has cost. Some day, if the mine holds out, the tunnel may pay for itself. But not to-day nor to-morrow. All it has done is to discover a vein, which has still got to be explored, as if it had only been found on the surface. Suppose the money this tunnel has cost had been expended by skilled prospectors on the surface. A very little of it would have discovered many equally promising lodes, and a quarter of the remainder would have tested them thoroughly.

We say nothing of the claims set up by the owners of the Mendota and the Bush (two lodes cropping out on the top of the mountain), that the lode cut in the tunnel belongs to them. Both cannot be right. Probably neither is so; though the tunnel-vein should crop out somewhere above, if we may judge from its size and character, which do not indicate a blind vein. But, right or wrong, these vexatious claims will always follow a discovery of this kind; and even the remote prospect of litigation is another argument against this method of finding veins.

We must conclude, therefore, that the good luck of the BURLEIGH tunnel should be a warning to capitalists not to imitate the enterprise. At best, the luck is no better than that of a number of rich mines in Clear Creek county, which began to pay a profit to their owners on a far less expenditure of capital; and if this new vein shall reimburse its owners for all previous outlay, it will be but one more instance of generous Nature, making compensation for the wastefulness of man. The generosity of Nature in this respect, however, is extremely whimsical and cannot be relied upon in every case.

But we must not forget that this discovery has "demonstrated the continuance of fissure veins in depth." If that was the object, it is a pity that the tunnel was not put deeper. There are shafts enough in Colorado over five hundred feet deep; and shafts have been sunk elsewhere to the depth of several thousand feet, upon fissure veins. What is the need of a "demonstration" for the pitiful depth of seven hundred? In fact, what we want to know is not the continuance, but the character, of lodes, in depth; and that is to be demonstrated for just one lode, and no more, at a time. Moreover, we need to know the character of a lode, not only at a particular depth, but all the way down; and the good old way of going down on it with a shaft is, under ordinary circumstances, the best.

But if we are wrong in this opinion; if there has been a doubt in the minds of some people, whether fissure veins continue in depth, and if that doubt has been triumphantly overcome by the discovery of seven hundred feet under ground of a vein which probably extends all the way to the surface, then let us at least hope that the momentous question is settled, and that the self-sacrificing company which settled it may remain without imitators. One Curtius was enough for Rome; let Georgetown ask no more!

We must prolong these remarks, too much extended already, to guard ourselves against misconceptions. We do not condemn deep tunnels, *driven on veins;* nor cross-tunnels, driven to intersect, open up, drain and ventilate well-developed and deeply-mined lodes; nor even exploring tunnels, cutting in depth groups of veins, where the cost of the work is borne by the owners of the mines above which are to be benefited by exploration or otherwise—provided that cost is not excessive; nor cheap and rapid prospecting work of any kind by means of tunnels.

We do condemn long, expensive and *speculative* tunnels in barren rock, undertaken by parties who have not developed the mines above to the point where tunnels are required for working. If these enterprises are prosecuted in the hope of underrunning and claiming well known mines belonging to other owners, the business is piracy; if in the hope of finding and working new lodes, it is folly.

As for Mr. BURLEIGH, he has found a vein in the most expensive way. We do not apply the term folly to him, because he had another legitimate object in view, namely, the thorough testing of his machines. Of course he will now go on to explore and open the mine. That is perfectly proper and wise. Our talk about tunnels is not intended as a warning to him, though it might have served as such three years ago. But when he and his friends shall have recovered their hundreds of thousands in dividends out of this mine, we shall be ready to say to them, "Gentlemen, don't spend all that money on another tunnel, even to find another lode."

But this piece of tardy advice would not be necessary. If those who have not learned by experience will not take advice, it is equally true that those who have learned by experience do not need advice. There are many people in Colorado who still belong in the first class; it is some consolation to reflect that a good strong paroxysm of the tunnel-fever will put them in the second.

The Coal Strike.

WE take pleasure in recording this week the subsidence of the riotous proceedings in Luzerne county, which we were compelled to chronicle in our last issue. We are also happy to learn from the latest accounts that the leaders of the Workingman's Benevolent Association were from the outset opposed to the adoption of any violent measures, and promptly exerted their influence and authority to put a stop to the disorder.

The fact that in the Scranton region the question between the miners and operators is simply one of money, and is disengaged from the many side issues which so complicate the difficulty in other regions, renders the occurrence of the disturbance at Scranton the more peculiar. It shows, however, that the task of keeping a large number of unemployed men out of mischief is by no means an easy one, and however strongly the leaders of the present movement may feel that their success depends [upon their ability to retain the passions of their followers, we fear that they will not in all cases be able to enforce discipline. The proverb that "the devil finds work for idle hands to do" is an old and true one, not likely to be disproved in the case of a Pennsylvania coal-strike.

The main points at issue between the various parties in the strike have scarcely been changed since it began, four months ago. The matter was first brought before the Pennsylvania Legislature, but no definite action was taken in that body, because those legislators who considered the miners in the wrong were afraid to say so, on account of the importance of the votes of the W. B. A. to their political party; and those who held the other opinion were equally afraid of offending the wealthy corporations.

Proceedings have, however, lately been instituted by the State in the courts against the Lehigh Valley and Philadelphia and Reading Railroad Companies, for violating their charters by enforcing extortionate charges for transporting coal. This advance in freights was intended to prevent small operators from sending coal to market. Whether the action of the railroad companies was legal remains to be decided in the courts; but the moral character of the this course is precisely the same as that of the intimidation of workmen by the strikers. Both are interferences with personal liberty and with public interests. Governor GEARY's proclamation against both is just the right thing,

The effects of the long strike are beginning to be severely felt by the merchants in the coal regions, who, in giving credit to the miners, have in many instances nearly or quite lost their own. In Scranton, for example, we learn that the merchants have, since the middle of December, been doing business entirely on credit, until they have exhausted their stock, and New York merchants refuse to give any further credit even to the largest houses. This will, of course, in a short time affect the miners, who will be unable to obtain any more goods upon trust, and be compelled either to call largely upon the funds of their association or resume work. The resources of the association are, however, great, and the strike may still last for a considerable time in the Northern region.

In the Lehigh region affairs are much more complicated. The miners there wish to become interested in the profits of the business of coal mining, no matter how far the price of coal advances, but do not wish to have any less than good wages when it declines below the actual cost of production. The operators insist upon their right to regulate their own business and aver their readiness at any time to pay fair prices for labor and assume alone the business risk.

The fairest, easiest and quickest solution of the difficulty would be to submit it to arbitration in the manner recommended by Mr. ECKLEY B. COXE, in our columns, some weeks ago. There are a great many honest and impartial men, of sufficient ability to comprehend all the points at issue in all their bearings, who could be induced to investigate the matter thoroughly, and give a verdict without fear or favor. Public opinion and their own sense of justice would compel both parties to acquiesce in such a verdict.

A proposition to submit the matter to arbitration has been offered by the operators but rejected by the miners. It is true that the proposition contained some provisions which may have been objectionable to the miners, but on the whole it did not seem unfair. The proposition was essentially to this effect: that the endeavors of the W. B. A. to control the operators in the working of their mines should cease; that operators should be free to engage such men as they saw fit to perform different kinds of work, without any dictation on the part of the union; that they should be free to discharge incompetent and inefficient workmen whether they belonged to the union or not; that in all the regions the men should go to work at once without any agreement as to wages; that in each region a board of arbitration and conciliation, to consist of six miners and six operators with an umpire, should meet on or before the twentieth day of April to decide upon the rate of wages to

be paid. The Lehigh operators, in a circular address, offered to their men in February last to submit to arbitration. To this circular we believe the W. B. A. has as yet made no reply.

Their answer to the recent proposition, in which they say that they have never had control of the mines and hence can not relinquish what they have never had is clever per haps, but not straightforward and honest. It is too late in the day for either party to resort to special pleading with advantage, and besides the question is too important.

The public, meanwhile, who may be regarded as the common enemy of both parties continues to suffer. They must have coal sooner or later and in order that they may, work must be resumed. They are willing to pay a price that will leave a fair margin for profit to the dealer and the operator and give fair wages to the workman, but they are not willing to be trifled with by either party : the one that tries it will suffer in the end. If the miners continue to reject the overtures made by the operators, they will place themselves in a very unenviable position. We hope that they will reconsider their action.

Progress of the Northern Pacific Railroad.

THE energy with which the building of this great thoroughfare is being pushed forward is an added guaranty of its early completion and its wise management. We learn from the financial agents of the road, Messrs. JAY COOKE & Co., that at the present date the grading is nearly finished for 266 miles, from Lake Superior, through Central Minnesota, to the eastern border of Dakota ; trains are running over 130 miles of completed track ; the Mississippi river is bridged at Brainerd, and once more joined to the lakes by rail, and track-laying is rapidly progressing westward. By September next, trains will run to the Red river, and the grading will probably be far advanced towards the Great Bend of the Missouri river; in Central Dakota.

In the meantime, work has been commenced the present season on the Pacific coast ; a large force of men is already employed in the valley of the Columbia river, in Washington Territory, and hereafter the work of construction will be pushed both eastward and westward toward the centre, with such rapidity as the best interests of the road may justify.

Including its purchase of the St. Paul and Pacific road, the Northern Pacific Railroad Company has 413 Miles of road now in operation, and before the close of the present season the length of finished track will be at least 560 miles. The new highway to the Pacific is being constructed at the lowest cost compatible with first-class work.

Electric Fuses.

NOTHING perhaps is more annoying to the mining engineer than after having carefully prepared and fired his blast, to find that his fuse fails to go off. Apart from the expense incident to the waste of numerous fuses in repeated trials, there is danger of defective ones hanging fire and so imperilling the lives of the workmen.

MESSRS. CHAS. A. BROWNE & BROTHER, of North Adams, Mass., have introduced a first-class article in which the great defects of the ordinary fuse are obviated. The large amount of blasting necessary to be done in the construction of the Hoosac Tunnel rendered the invention of a thoroughly reliable article necessary, and the Messrs. BROWNE found that their fuse was used there with perfect success. The firm announces that it has facilities for supplying their invention, and having been appointed special agents for the sale of insulated wires, manufactured by SAMUEL C. BISHOP, of New York, the original manufacturer of gutta percha insulated wires, in the United States, they are prepared to furnish leading wire, sub-marine blasting wire, gutta percha for insulating purposes, &c., &c., at the lowest prices.

The Funding of the Debt.

THE fact that the people of this country are beginning to appreciate the wealth and stability of their republic, is shown by the rapidity with which Mr. BOUTWELL'S two hundred millions of funding fives are being taken. Nearly sixty million have already been subscribed for before the authorities have well begun the work of negotiation. The chances seem now to be in favor of the practicability of funding a large portion of it at even lower rates of interest. The knowing ones confidently predict ere long the acceptance of 4½ per cents along with the fives.

The fact of the matter is, that there is so much money in the country which seeks investment in perfectly reliable securities, that the government need no longer to pay much higher rates than those that obtain in the wealthiest European countries.

Eastern Oregon.

WE learn from private sources that quartz mining promises increased activity during the coming summer. In Eagle Creek district a lode six feet wide has been discovered. It is called the Argentum, and some of the ore has yielded at the rate of fifty-five dollars per ton by the milling process. The lode is situated on Burnt River. The Empire, on the same river, about one mile from the old Jordan ranch, with good placers all about it, is said to prospect well. Several mills in the district will soon start up for custom work.

Operations on the Ruckle mine have stopped for the present. California partners are said to have become interested and to contemplate putting up a steam mill at the mine. Some rich float gold-quartz has been picked up near Pochahontas, but the lode has not yet been found.

Determination of Carbon in Steel.

THE direct combustion of the carbon in oxygen gas according to HERMANN rapidly furnishes exact results.

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113,456.—CORN-SALVE.—Anthony Seabold, Florence, Ohio.

113,457.—MOP-HEAD.—Samuel Selden and Matthew Griswold, Jr., Erie, Pa.

113,458.—WAGON-BOLSTER STAKE.—Lewis Washington Shaeffer, Elizabethtown, Ky.

113,459.—COMPOUND FOR CURE OF FOOT-ROT IN SHEEP.—William T. Sherman, Marengo, Ohio.

113,460.—FIRE-ALARM.—Horatio N. Schultz, Mechanicstown, Md.

113,461.—BIRD-CAGE MAT.—Isaac A. Singer, New York, N. Y.

113,462.—CAR-COUPLING.—George C. Spangler, Allegheny City, Pa., assignor to himself and Simpson H. Daft, same place.

113,463.—FRICTION-CONDENSER FOR ILLUMINATING-GAS.—William H. St. John, Brooklyn, N. Y., and Samuel O. Rockwell, Jersey City, N. J.

113,464.—CUTTER-HEAD.—Alonzo Louis Sweet, Norwich, Conn.

113,465.—PERMUTATION-LOCK.—William Terwilliger, New York, N. Y., assignor to himself and Frederic H. North, New Britain, Conn.

113,466.—TUBULAR STEAM-BOILER.—Charles A. Thompson, Flushing, N. Y.

113,467.—FASTENING FOR MEETING-RAILS OF SASHES.—Nathan Thompson, Brooklyn, N. Y.

113,468.—HALTER.—James Thornton, Wellsville, N. Y., assignor to himself and E. G. Latta, same place.

113,469.—ATTACHMENT TO HAMES.—James Thornton and Emmit G. Latta, Wellsville, N. Y.

113,470.—BREECH-LOADING FIRE-ARM.—Frank Tiesing and Charles Gerner, New Haven, Conn., assignors to Eli Whitney, same place.

113,471, antedated March 2, 1871.—SHIP'S TRESTLE-TREE.—Henry Townsend, Philadelphia, Pa.

113,472.—LAMP-BURNER.—Joseph Trent, Millerton, N. Y.

113,473.—BASE-BURNING STOVE.—Jasper van Wormer, Albany, N. Y., assignor to himself and Michael McGarvey, same place.

113,474.—HARVESTER-RAKE.—Cyrenus Wheeler, Jr., Auburn, N. Y.

113,475.—HARVESTER.—Cyrenus Wheeler, Jr., and Calvin Young, Auburn, N. Y.

113,476.—MOVABLE PARTITION.—Douglas Joseph Williams, Birmingham, England.

113,477.—BLOCK FOR TOP-PROP JOINTS FOR CARRIAGES.—John J. Wilson, New York, N. Y.

LIST OF PATENTS FOR THE WEEK ENDING APRIL 11, 1871.

113,478.—MANUFACTURE OF PEAT-FUEL.—David Aikman, Montreal, Canada.

113,479.—TICKET-HOLDER.—Albert F. R. Arndt, Cleveland, Ohio.

113,480.—PITCHING BARRELS.—William Anheuser, St. Louis, Mo.

113,481.—FIRE-CHAMBER FOR PUDDLING STEAM-BOILER AND OTHER FURNACES.—William Fordyce Beecher, Pittsburg, Pa.

113,482.—COMBINED PLOW AND SEEDER.—W. C. Bibb, Madison, Ga.

113,483.—LET-OFF MECHANISM FOR LOOMS.—Erastus Brigham Bigelow, Boston, Mass.

113,484.—PLOW.—Jerome Blanchard, Iowa Falls, Iowa.

113,485.—ELASTIC CEMENT FOR LINING PETROLEUM BARRELS.—John James King Boote and William Anderson Gibson, Cleveland, Ohio.

113,486.—MANUFACTURE OF RUBBER BELTING.—A. O. Bourn, Providence, and Isaac F. Williams, Bristol, R. I.

113,487.—EDGING-MACHINE.—Henry Bradt, Manistee, Mich.

113,488.—MACHINE FOR REDUCING WOOD FOR THE MANUFACTURE OF PAPER PULP.—James Bridge, Augusta, Me.

113,489.—TURBINE WATER-WHEEL.—McKendre A. Brooks, La Porte, Ind.

113,490.—JOURNAL-BOX.—Arthur Gibson Brown, Wareham, Mass.

113,491.—FILTER.—James Brown, San Francisco, Cal., assignor to Ira D. Thompson, same place.

113,492.—HEATING-STOVE.—Esek Bussey, Troy, N. Y.

113,493.—WASHING-MACHINE.—John E. Carroll and John Lord, Philadelphia, Pa.

113,494.—JOURNAL-BOX.—William T. Carroll, Medway, Mass., assignor to George Draper & Sons.

113,495.—CORN-HUSKER.—Erastus H. Carver, Humberstone, Canada, and George M. Baker, Buffalo, N. Y.

113,496.—HASP-LOCK.—Wm. N. Chamberlain, Denton, Mich.

113,497.—CRADLE.—John B. Charlton, Kalamazoo, Mich.

113,498.—SEWING-MACHINE.—Milton Chase, Haverhill, Mass.

113,499.—LOCK FOR HAND-CUFFS.—Horace H. Cheney, East Saginaw, Mich.

113,500.—WEATHER-STRIP.—Franklin A. Coats, Kelloggsville, Ohio.

113,501.—PLATE BUTT-HINGE.—John J. Crooke, Southfield, and Lewis Crooke, New York, N. Y.

113,502, antedated March 24, 1871.—PREPARATION OF PAPER PULP AND MANUFACTURE OF PAPER.—Julien Denis, Stamford street, Blackfriars, Great Britain.

113,503.—COMPRESSION COCK.—William Dinnen, Detroit, Mich., assignor to the Detroit Novelty Works, same place.

113,504.—CARRIAGE SEAT AND TOP.—Lewis Z. Dodds, South Bend, assignor to himself and John B. Moulton, La Porte, Ind.

113,505.—PRESERVING AND TRANSPORTING FRESH MEATS.—Wm. Dugan, Chicago, Ill.

113,506.—DRAWER-PULL LABEL-HOLDER.—John A. Evarts and Pietro Cinquini, West Meriden, Conn., assignors to Bradley & Hubbard, same place.

113,507.—HYDRANT.—James Fernan, Cleveland, Ohio.

113,508.—CONSTRUCTION OF STEAM-HAMMER STANDARDS.—Oscar C. Ferris and Frederick B. Miles, Philadelphia, Pa.

113,509, antedated March 30, 1871.—FIRE-ESCAPE.—William Gardner, Boston, Mass.

113,510, antedated March 29, 1871.—RAILROAD SPIKE.—Charles Gaylord, Washington, D. C.

113,511.—CULTIVATOR.—Julius Gerber and Horace Brown, Rockford, Ill.

113,512.—MACHINE FOR TAPPING NUTS.—J. L. Gill, Jr., Columbus, Ohio.

113,513.—GASOLINE ATTACHMENT FOR COOKING-STOVES.—Frederick Hainsworth, Chicago, Ill.

113,514.—BRICK-MACHINE.—Enoch Hallett, Hillsdale, Mich.

113,515.—FLY-TRAP.—Clinton R. Hardy, Lexington, Ind.

113,516.—FITTER.—Birdsill Holly, Lockport, N. Y.

113,517.—REGULATING AND SAFETY-VALVE.—Birdsill Holly, Lockport, N. Y.

113,518.—BALE-TIE.—John Holmes and James Corbett Holtzaphell Slack, Manchester, England.

113,519.—FINGER GUARD.—Levi Holmes, Green Point, N. Y.

113,520.—CULTIVATOR.—Almon Hunt, Macomb, Ill.

113,521.—KING-BOLT FOR CARRIAGES.—Dwight Hyde and E. H. Andrews, Bridgeport, N. Y.

113,522.—SEED-DRILLING MACHINE.—Oliver Hyde, Oakland, Cal.

113,523.—BALANCE-VALVE FOR STEAM-ENGINES.—N. Jenkins, Detroit, Mich.

113,524.—PACKING TUBE FOR VAPOR-LAMPS.—Wm. E. Jervey, New Orleans, La.

113,525.—THILL-COUPLING.—Daniel A. Johnson, Boston, Mass.

113,526.—SOAP FOR POLISAING METALS, &c.—Ezra A. Johnson, Philadelphia, Pa., assignor to himself and Alexander Warfield, same place.

113,527.—CHIMNEY-TOP.—M. S. Kavanaugh, Detroit, Mich.

113,528.—SPARK-ARRESTER FOR LOCOMOTIVES.—F. Kearney and Luke F. Tronson, Newark, N. Y.

113,529.—PLATFORM-SCALE.—M. Kennedy, New York, N. Y.

113,530.—LIGHTNING-ROD.—Lewis King, East Cleveland, Ohio.

113,531.—SAWING-MACHINE.—Phineas F. King and Edwin A. King, St. Louis, Mo.

113,532.—DOLL.—Jacob Laemann, Philadelphia, Pa.

113,533.—STEAM-GENERATOR.—Erasmus D. Lacy, Rockford, Ill., assignor to Barnas C. Sears, same place.

113,534.—GRINDING-MILL.—Franklin H. La Port, Clarinda, Iowa.

113,535, antedated April 1, 1871.—BASE-BURNING STOVE.—Silas Hoffman La Rue, Allentown, Pa., assignor to himself and W. J. Hoxworth, same place.

113,536.—DEPURATOR.—Frederick C. Leland and Samuel W. Poland, Lowell, Mass.

113,537.—WINDOW-SCREEN.—Charles F. Linscott, Chicago, Ill.

113,538.—BUREAU TRAVELING-TRUNK.—H. McKinnon, Cleveland, Ohio.

113,539.—BERTH FOR SLEEPING-CARS.—Benjamin F. Manier, Green Island, N. Y., assignor to himself and Thomas R. Smith, same place.

113,540.—BRICK AND OTHER MOLDS.—Henry Martin, Brooklyn, N. Y.

113,541.—HARNESS SADDLE-TREE.—John H. Martin, Columbus, Ohio.

113,542.—NEEDLE-SETTER AND THREADER.—Charles F. Martine, Boston, Mass.

113,543.—WEIGHING ATTACHMENT TO WAGONS.—William H. McCormick, Muncie, Ind., assignor to himself and John T Williams, same place.

113,544.—SPINDLE FOR WRINGER-ROLLERS.—T. E. McDonald, Trenton, N. J.

113,546.—MACHINE FOR TRIMMING THE SOLES OF BOOTS AND SHOES.—Daniel McLaughlin, Baltimore, Md.

113,547.—PACKING PISTON OF STEAM-ENGINES, &c.—John C. Merriam, Olneyville, R. I.

113,548.—FOLDING TABLE-TOP.—Charles W. Mills, Chicago, Ill.

113,549.—FIRE-POT FOR STOVES AND FURNACES.—Ed. Mingay, Boston, Mass.

113,550.—CORN-PLANTER.—William Morrison, Carlisle, Pa.

113,551.—CARRIAGE-STEP.—Francis B. Morse, Plantsville, Ct., assignor to H. D. Smith & Co., same place.

113,552.—HORSE HAY-FORK.—William A. Myers, York, Pa.

113,553.—STEAM-ENGINE.—Nathan E. Nash, Westerly, R. I.

113,554.—WEATHER-BOARD GAUGE.—Matthew Newlove, Burlington, Iowa, assignor to himself and George Glebrick, same place.

113,555.—HOISTING APPARATUS.—Charles R. Otis and Norton P. Otis, Yonkers, N. Y.

113,556.—COOKING-STOVE.—Daniel E. Paris, Troy, N. Y.

113,557.—METAL SCREW AND NUT.—Henry G. Pearson, New York, N. Y.

113,558.—PEN-HOLDER.—O. A. Pennoyer, Washington, D. C.

113,559.—FRAME FOR WIRE-MATTRESSES.—George C. Perkins, Hartford, Conn.

113,560.—DOVETAILING-MACHINE.—David Pomeroy, San Francisco, Cal., assignor to Elander Heath, same place.

113,561.—PADDLE-WHEEL.—Elijah Pratt, New York, assignor to himself, David Mundell and Alfred Mundell, Brooklyn, N. Y.

113,562.—ARTICLE FOR FOOD FROM ALGAE OR SEA-MOSSES.—Wm. J. Rand, Jr, Brooklyn, E. D., N. Y.

113,563.—CLOTHES-LINE CONDUCTOR.—David Reed and Amos Shaeffer, Medway, Ohio.

113,564.—GRAIN-DRILL.—Daniel Rentchler, Belleville, Ill.

113,565.—MACHINE FOR SAWING STAVES.—Assaria Rewrick, San Francisco, Cal.

113,566.—FRICTION-CLUTCH.—George S. Reynolds, Lebanon, N. H.

113,567.—GAS-HEATER.—Orlando McKnight Reynolds and D. T. Kitchell, Oil City, Pa.

113,568.—WHIFFLETREE.—Joseph H. Riggs, Chelsea, Mass.

113,569.—MEDICAL COUMPOUND.—Joseph A. Robbins, Medford, Mass.

113,570.—OIL-CLOTH PRINTING MACHINE.—Charles Rommel, Elizabeth, N. J.

113,571.—DENTISTS' INSTRUMENT-STAND.—John J. Ross, Hernando, Miss.

113,572.—FISH NET SUPPORTER.—Benjamin Rider, Jr., South Grrington, Me.

113,573.—SPRING FOR VEHICLES.—C. W. Saladee, St. Catharines, Canada.

113,574.—SPRING FOR VEHICLES.—C. W. Saladee, St. Catharines, Canada.

113,575.—RING-SPINNING MACHINE.—Jacob H. Sawyer, Lowell, Mass.

113,576.—SOFA-BED.—Charles C. Schmitt, New York, N. Y.

113,577.—BUTTON.—Gustav Adolph Schultz, Louisville, Ky.

113,578.—KINDLING MATERIAL.—Theodore Schwartz, New York, N. Y.

113,579.—FEED-CUTTER.—Joseph Seaman, Chicago, Ill.

113,580.—CHURN.—Abraham Shafier, Vandalia, Mich.

113,581.—FLY-BRUSH.—David Shankland and Emerson B. Hopkinson, Nevada city, Cal.

113,582.—WASH-BOILER.—John H. Siebcke, Ann Arbor, Mich.

113,583.—REFINING IRON AND STEEL.—Alexander H. Siegfried, South Bend, Ind., assignor to himself and George B. Garman.

113,584.—PROCESS AND APPARATUS FOR THE PRODUCTION OF CAST-STEEL FROM ORES.—Charles William Siemens, Westminster, England.

113,585.—HOISTING APPARATUS.—Thomas Silver, New York, N. Y.

113,586.—CURRENT WATER-WHEEL.—Heman B. Sinclair, Paw Paw, Mich.

113,587.—MANUFACTURE OF STEEL.—Fred. J. Slade, Trenton, N. J.

113,588.—ROOFING COMPOSITION.—Jacob H. Smyser, Pittsburg, Pa.

113,589.—ELECTRO-MAGNETIC BURGLAR-ALARM.—James P. Snyder, Brooklyn, N. Y.

113,590.—APPARATUS FOR EVAPORATING CANE-JUICE, &c.—Ebenezer Sperry, Chicago, Ill.

13,591.—LIQUID AND GAS-METER.—D. Brainerd Spooner, Syracuse, N. Y.

1113,592.—WATER-WHEEL.—John H. Staples, Wells, assignor of one-half his interest to John H. Ferguson & Samuel Clark, and one-half to Samuel Clark, same place.

113,593.—SEWING BOOTS AND SHOES.—Michael J. Stein, New York, N. Y.

113,594.—SPINNING-WHEEL.—Joseph Strain, Artemesia, Canada.

113,595.—KING-BOLT FOR WAGONS.—Lee T. Swartwout, Locke, N. Y.

113,596.—BED-BOTTOM.—Joseph Tinney, Westfield, N. Y.

113,597.—WATER-METER.—William Van Anden, Poughkeepsie, N. Y.

113,598.—AXLE-GAUGE.—Richard K. Vestal, Santa Cruz, Cal.

113,599.—OIL-RESERVOIR FOR AXLE-BOXES.—Ernest Von Jeinsen and James Monroe McDonald, San Francisco, Cal.

113,600.—BALANCE-VALVE.—Alexander Wanich, Philadelphia, Pa.
113,601.—COMBINED THIMBLE AND LOCKET.—William A. Wansleben, Washington, D. C.
113,602.—SMOKE-HOUSE.—Asa Waterman, Providence, R. I.
113,603.—BOTTLE-FASTENING.—Ephraim D. Weatherbee, Worcester, Mass.
113,604.—MACHINE FOR THE MANUFACTURE OF COMPOSITION ROOFING.—Jay J. Wiggin, New York, N. Y.
113,605.—FENDER OR CUSHION FOR FURNITURE.—George R. Willmot, Meriden, Conn.
113,606.—PIVOT FOR SEATS.—John J. Wilson, New York, N. Y.
113,607.—BRACKET SEAT.—John J. Wilson, New York, N. Y.
113,608.—BUFFER-HEAD AND DRAW-BAR FOR RAILWAY CARS.—John T. Wilson, Pittsburg, Pa., assignor to himself, William D. Berry, and John A. Courtney, same place.
113,609.—WINE-PRESS.—Abraham F. Wyker, South Easton, Pa.
113,610.—ATTACHMENT FOR SEWING-MACHINES.—Enoch S. Yentzer, Ottawa, Ill.
113,611.—MACHINE FOR SCRAPING IRON.—Christopher Zug, Pittsburg, Pa.
113,612.—ELECTROPLATING WITH NICKEL.—Isaac Adams, Jr., Boston, Mass.
113,613.—STEAM-GENERATOR.—John F. Allen, New York, N. Y.
113,614.—PIPE-ELBOW.—William Austin and William Obdyke, Philadelphia, Pa.
113,615.—SKATE.—William Henry Barker, Windsor, Nova Scotia.
113,616.—BALANCED SLIDE-VALVE.—Albert G. Barrett, Barrett, Kansas.
113,617.—ROOT OR TONIC BEER.—Benjamin Bates, Baltimore, Md.
113,618.—MACHINE FOR CUTTING LEATHER.—Horace H. Bigelow, Worcester, Mass.
113,619.—PERFUMING AND DISINFECTING APPARATUS.—Otto Boldemann, New York, N. Y.
113,620.—AUTOMATIC FAN.—George C. Bovey, Cincinnati, Ohio.
113,621.—KEY-HOLE GUARD.—George C. Bovey, Cincinnati, Ohio.
113,622.—CASK FOR PASTE.—Henry Braunhold, New York, N. Y.
113,623.—SHAWL-STRAP.—Gustavus Benson Broad, Waterville, Me.
113,624.—APPARATUS FOR COMPRESSING AND INSERTING RUBBER BLOCKS INTO CARRIAGE-CLIPS.—Thomas H. Brown and Charles E. Gilman, Chicago, Ill.; said Gilman assigns his right to said Brown.
113,625.—COMBINED PLOW AND SCRAPER.—John Charles Cameron, Madison Station, Miss.
113,626.—COTTON-SEED PLANTER.—Francis F. Carroll, Midway, S. C.
113,627.—GANG-PLOW.—Luke Chapman, Collinsville, Conn., assignor to himself and The Collins Company.
113,628.—MASTIC ROOFING.—John Cipperly, Galesville, N. Y.
113,629.—PICKET-CUTTER.—James W. Clark, Outville, Conn.
113,630.—FAUCET.—John S. Clute, Henry W. Trissler, and Walter D. Trissler, Cleveland, Ohio.
113,631.—MACHINE FOR SPLITTING AND SKIVING LEATHER.—Alexander Cochran, Athens, Ohio.
113,632.—HARVESTER-RAKE.—Otis B. Colcord, Greenville, Ill.
113,633.—CONNECTION FOR RAILWAY CAR.—Joseph R. Crabill, La Crosse, Ill.
113,634.—METALLIC CARTRIDGE.—Silas Crispin, New York, N. Y.
113,635.—MACHINE FOR CUTTING LOZENGES, &c.—William Edward Demant, West Hoboken, N. J., assignor to himself and William Hessin, Toronto, Canada.
113,636.—WAGON-BRAKE.—Robert H. Dement, Hudson, Ill.
113,637.—STALL FOR HORSES.—Daniel M. Denison, Savannah, Ga.
113,638.—ATTACHMENT TO OIL-WELL TUBINGS.—William W. Dewy, Tidioute, Pa.
113,639.—BUCK-SAW FRAME.—Jerome C. Dietrich, Rochester, N. Y.
113,640.—COTTON-CHOPPER.—Charles Bryant Douglas, Montgomery, Ala.
113,641.—SHIP-PUMP.—David A. Dunham, Pilatka, Fla.
113,642.—MOLD-BOARD FOR PLOWS.—Isaac T. Dyer, Macon, Ga.
113,643.—COOKING-STOVE.—James Easterly, Albany, N. Y., assignor to himself and James Gray, same place.
113,644.—NAIL AND TACK-PLATE FEEDER.—David J. Farmer, Wheeling, W. Va.
113,645.—NON-FREEZING WATER-PIPE.—Valentine Fogerty, Boston, Mass.
113,646.—PNEUMATIC SIGNALING APPARATUS.—William Foster, Jr., New York, N. Y.
113,647.—PNEUMATIC SIGNALING APPARATUS.—William Foster, Jr., New York, N. Y.
113,648.—MANUFACTURE OF BOLSTER FOR CUTLERY.—James D. Frary, New Britain, Conn.
113,649.—FIRE-ALARM TELEGRAPH APPARATUS.—John N. Gamewell, Hackensack, N. J.
113,650.—COMBINED LAMP AND REFLECTOR.—Henry J. Goff, Dubuque, Iowa.
113,651.—TURNING AND BORING-MILL.—George A. Gray, Jr., Cincinnati, Ohio.
113,652.—LIFE-PRESERVING MATTRESS.—James Durell Greene, New York, N. Y.
113,653.—MACHINE FOR FACING T-HEADS.—John Griffith and George W. Wundram, New York, N. Y.
113,654.—TOY.—John Hamilton Harbison, Philadelphia, Pa.
113,655.—DUMPING-CAR.—William Henry Harding and George Frederic Morse, Portland, Me.
113,656.—VISE.—William P. Harwood, Cambridge, N. Y., assignor to James F. Hall and John L. Marshall, same place.
113,657.—FARM-GATE.—Henry P. Haskin, Roscoe, Ill.
113,658.—BOOT AND SHOE HEEL-BURNISHING MACHINE.—Gardner C. Hawkins and Albert G. Mead, Boston, and Vivian Kimball Spear, Lynn, Mass.
113,659.—SHIRT.—James Hayden, Philadelphia, Pa.
113,660.—SHOW-CASE.—George A. Hearn, Jr., New York, N. Y.
113,661.—CANAL-LOCK VALVE.—George Heath, Little Falls, N. Y.
113,662.—CHAIR AND BED COMBINED.—Gabriel D. Heathwole, Bridgewater, Va,
113,663.—STAPLE-MACHINE.—Benjamin Hershey, Erie, Pa., assignor to himself, E. Geer, Richard Dudley, and Richard F. Gaggin.
113,664.—RUBBER SPRING FOR WAGONS.—Aaron Higley, Cleveland, Ohio.
113,665.—ATTACHING PLOW-POINTS.—George W. Hildreth, Lockport, N. Y.
113,666.—MACHINE FOR SAPPING TIMBER FOR SHINGLES.—George M. Hinkley, Milwaukee, Wis.
112,667.—FIRE-ESCAPE.—Joseph Hoeflinger, Carrollton, Mo.
113,668.—SURFACE-CONDENSER.—Birdsill Holly, Lockport, N. Y.
113,669.—RUFFLE-GUIDE AND BAND-HOLDER FOR SEWING-MACHINES.—Elijah Leavitt Howard, Malden, assignor to George Augustus Whiting, Charlestown, Mass.
113,670.—MACHINE FOR SHARPENING HORSESHOE CALKS.—Hamilton Howell, Salem, Ohio.
113,671.—COTTON-PLANTER.—John Hughes, New Berne, N. C.
113,672.—MACHINE FOR DRESSING AND PUNCHING SLATES.—Julius Jaeger, Tompkinsville, N. Y.
113,673.—SASH-HOLDER.—Morton Judd, New Haven, Conn.
113,674.—COFFEE-POT.—Richard H. Kuper, Lockport, N. Y.
113,675.—MACHINE FOR COVERING CORD.—Reuben Lewis, New York, N. Y.
113,676.—MILLSTONE EXHAUST.—Jacob Lingenfelter, Bloody Run, Pa.
113,677.—SHOT-CARTRIDGE.—Charles W. Lovett, Jr., Boston, Mass.
113,678.—SLATE-FRAME.—Peter Lugenbell and William A. Ford, Greensburg, Ind.
113,679, antedated April 4, 1871.—LUBRICATING WOOL DURING THE PROCESS OF MANUFACTURE.—John James Lundy, Leith, near Edinburgh, Great Britain.
113,680.—BIT-BRACE.—John T. Lynam, Jeffersonville, Ind.
113,681.—AXLE-SKEIN.—Lorenzo Mayhew, Greenfield, N. Y.
113,682.—WHEEL FOR VEHICLES.—Robert W. McClelland, Springfield, Ill., assignor to himself and John McCreery, same place.
113,683.—EXTENSIBLE SHELF.—Sophia H. Mercer, Washington, D. C.
113,684.—HEEL-TRIMMING MACHINE.—John Q. Moulton, Lynn, Mass.
113,685.—LUBRICATING PIVOT FOR TURN-TABLES.—John W. Murphy, Philadelphia, Pa.
113,686.—MACHINE FOR CLEANING GRAIN.—Moses T. Nesbitt, Colora, Md.
113,687.—MECHANICAL MOVEMENT.—Archibald Nimmo, Philadelphia, Pa., assignor to himself, Thomas Moran, and Valentine Strausse, same place.
113,688.—PULLEY-BLOCK.—Joseph W. Norcross, Boston, Mass.
113,689.—TACKLE-HOOK.—Joseph W. Norcross, Boston, Mass.
113,690.—MILK-COOLER.—Albert Northrop, Elyria, Ohio.
113,691.—EXCAVATOR.—Jason C. Osgood, Troy, N. Y.
413,692.—COMBINED BEDSTEAD, BUREAU, AND STAND.—Anna Parker and Lewis A. Parker, Girard, Kan.
113,693.—SELF-RECORDING BAROMETER.—David Peelor, Johnstown, Pa.
113,694.—STOVE-PIPE DRUM.—William L. Phillips, Normal, Ill.
113,695.—GLOVE.—John H. Putnam, Gloversville, N. Y.
113,696.—WHIFFLETREE.—Samuel L. Reynolds and John W. Reynolds, Pittsburg, Pa.
113,697.—SLIDING-DOOR HANGER.—George Rumsey, Watkins, N. Y.
113,698.—SAWING-MACHINE.—Samuel S. Sherman and Hiram B. Gunn, Eau Claire, Wis.
113,699.—DIE FOR TAKING IMPRESSIONS FROM CLOTH, &c.—John Joseph Charles Smith, Somerville, assignor to Metallic Art Works, Boston, Mass.
113,700.—COTTON AND HAY PRESS.—Reuben Stallings, Louisburg, N. C.

REISSUES.

4,328.—PRINTING PHOTOGRAPHS.—Joseph Albert, Munich, Bavaria.—Patent No. 97,336, dated November 30, 1869.
4,329.—Division A.—WATER-WHEEL.—Joel T. Case, Bristol, Conn., assignor to the National Water-Wheel Company.—Patent No. 108,757, dated November 1, 1870.
4,330.—Division B.—WATER-WHEEL.—Joel T. Case, Bristol, Conn., assignor to the National Water-Wheel Company.—Patent No. 108,757, dated November 1, 1870.
4,331.—Division A.—LANTERN.—William H. Bonnell, Buffalo, N. Y., assignor to himself and Horace Parmelee, same place.—Patent No. 96,772, dated November 16, 1869.
4,332.—Division B.—LANTERN.—William H. Bonnell, Buffalo, N. Y., assignor to himself and Horace Parmelee, same place.—Patent No. 96 772, dated November 16, 1869.
4,333.—TOOL-HOLDER.—William W. Draper, Greenfield, Mass.—Patent No. 22,635, dated January 18, 1859.
4,334.—STEM-SETTING WATCH.—Jules Jürgensen, Locle, Switzerland.—Patent No. 61,207, dated January 15, 1857.
4,335.—CAR-SPRING.—Albert Hebbard and John P. Onderdonk, Buffalo, N. Y., assignees of Albert Hebbard.—Patent No. 53,222, dated March 13, 1856.
4,336.—STOCK-CAR.—Lee Swearingen, Grafton, W. Va., assignor to the National Cattle-Car Company, Salem, Ohio.—Patent No. 28,517, dated May 29, 1860.
4,337.—AIR-COMPRESSING APPARATUS.—John S. Patric, Rochester, N. Y.—Patent No. 47,328, dated April 18, 1865.
4,338.—FAUCET.—James Powell, Cincinnati, Ohio.—Patent No. 25,349, dated September 6, 1859.
4,339.—CAR-COUPLING.—Warren B. Snedaker, Phœnix, N. Y.—Patent No. 108,404, dated October 18, 1870.
4,340.—CATTLE-CAR.—John W. Street, Marshalltown, Iowa.—Patent No. 96,362, dated November 2, 1869.
4,341.—WHEELBARROW-FRAME.—Beckwith W. Tuthill, Oregon City, Oregon.—Patent No. 110,698, dated January 3, 1871.

DESIGNS.

4,773.—BOTTLE.—Thomas B. Atterbury, Birmingham, Pa.
4,774.—ORNAMENTATION OF GLASS-WARE.—Mary B. Campbell, Pittsburg, Pa., assignor to Campbell, Jones & Co., same place
4,775.—CARPET-PATTERN.—Robert R. Campbell, Lowell, Mass., assignor to Lowell Manufacturing Company, same place.
4,776.—CARPET-PATTERN.—Robert R. Campbell, Lowell, Mass., assignor to Lowell Manufacturing Company, same place.
4,777.—CARPET-PATTERN.—Robert R. Campbell, Lowell, Mass., assignor to Lowell Manufacturing Company, same place.
4,778.—CARPET-PATTERN.—Robert R. Campbell, Lowell, Mass., assignor to Lowell Manufacturing Company, same place.
4,779.—BURIAL-CASKET.—Edward L. Cooke and Jabez H. Whitmore, Hartford, Conn.
4,780.—HANDLE FOR STOP-COCKS.—William Samuel Cooper, Philadelphia, Pa., assignor to Cooper, Jones & Co., same place.
4,781.—CARPET-PATTERN.—Albert Cowell, Kidderminster, England, assignor to James Humphries & Sons, same place.
4,782.—CARPET-PATTERN.—Albert Cowell, Kidderminster, England, assignor to James Humphries & Sons, same place.
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4,786.—CARPET-PATTERN.—Albert Cowell, Kidderminster, England, assignor to James Humphries & Sons, same place.
4,787.—CARPET-PATTERN.—Albert Cowell, Kidderminster, England, assignor to James Humphries & Sons, same place.
4,788.—FORK OR SPOON-HANDLE.—John M. Culver, Wallingford, Conn., assignor to Hall, Elton & Co., same place.
4,789.—BITTER-TUBE.—John L. Dawes, Pittsburg, Pa.
4,790.—HINGE.—Thomas Drake, Cincinnati, Ohio.
4,791.—FLANGE AND CRANK.—William W. Eastman, Meadville, Pa.
4,792.—PRINTED FABRIC.—Thomas Hardcastle, of the Bradshaw Works, near Bolton, England.
4,793.—PUZZLE-BLOCK.—Samuel Loyd, New York, N. Y.
4,794.—STEAM-ENGINE-GOVERNOR CASE.—John Augustus Lynch, Boston, Mass.
4,795.—WATCH-PLATE.—Eugene Marcile, New York, N. Y.
4,796.—BOX.—Augustus H. Mershon, East Saginaw, Mich.
4,797.—CLOCK-CASE.—Nicholas Müller, New York, N. Y.
4,798.—CARPET-PATTERN.—Elemir J. Ney, Dracut, Mass., assignor to Robert Beattie & Sons, Little Falls, N. J.
4,799.—WATCH-PLATE.—Edwin Hathaway Perry, Boston, Mass.
4,800.—REVOLVING GRATE.—John D. Vance, Cincinnati, Ohio, assignor to himself and Forace M. Eddy, same place.
4,801.—PRINTED MATERIAL FOR APRONS.—William H. Walton, Brooklyn, N. Y.
4,802.—PRINTED MATERIAL FOR GORED SKIRTS.—William H. Walton, Brooklyn, N. Y.
4,803.—HAND-STAMP.—Frank Waters, Philadelphia, Pa., assignor to Thomas W. Starr, same place.
4,804.—ORNAMENT FOR FOUNTAINS, &c.—Jonathan Moore and William Wilkinson, Brooklyn, N. Y., assignors to Jonathan Moore and A. Horton, same place.
4,805.—ORNAMENT FOR FOUNTAINS, &c.—Jonathan Moore and William Wilkinson, Brooklyn, N. Y., assignors to Jonathan Moore and A. Horton, same place.
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4,808.—ORNAMENT FOR FOUNTAINS, &c.—Jonathan Moore and William Wilkinson, Brooklyn, N. Y., assignors to Jonathan Moore and A. Horton, same place.
4,809.—FONNTAIN-VASE.—Jonathan Moore and William Wilkinson, Brooklyn, N. Y., assignors to Jonathan Moore and A. Horton, same place.

TRADE-MARKS.

216.—THRASHING-MACHINE.—James Brayley, Buffalo, N. Y.
217.—PLOW.—Bucher, Gibbs & Co., Canton, Ohio.
218.—BITTERS.—Dr. S. B. Hartmann & Co., Lancaster, Pa.
219.—STATIONERS' HARDWARE.—Thomas S. Hudson, East Cambridge, Mass.
220.—COTTON GOODS.—B. B. & R. Knight, Providence, R. I.
221.—WHISKY.—Benjamin K. Reynold's, Boyd's Station, Ky.
113,701.—VARIABLE ECCENTRIC FOR STEAM-ENGINE GOVERNOR.—Samuel Stanton, New York, N. Y.
113,702.—MANUFACTURE OF PNEUMATIC GAS FOR ILLUMINATING, &c.—John W. Stow, San Francisco, Cal.
113,703.—SAWING-MACHINE.—Jerome B. Sweetland, Pontiac, Mich.
113,704.—SEWING-MACHINE FOR UMBRELLAS AND PARASOLS.—William John Tate, Philadelphia, Pa., assignor to William A. Brown & Co., same place.
113,705.—CARRIAGE.—Chauncey Thomas, Boston, Mass.
113,706.—PRESERVING WOOD.—Nathan H. Thomas, New Orleans, La.
113,707.—LEATHER-ROUNDING MACHINE.—James H. Tizzard, Easton, assignor to himself and Samuel T. Tizzard, Dayton, Ohio.
113,708.—ROLL FOR ROLLING HOOP, BAR, AND ROD-IRON.—James Tranter and Joseph Kinsey, Cincinnati, Ohio.
113,709.—SHOVEL-HANDLE.—Henry C. Trask, Vienna, Me.
113,710.—WAGON-SPINDLE.—James Monroe Walters, Schwenksville, Pa.
113,711.—STOVE-UTENSIL HOLDER.—Stewart Watt, Barnesville, Ohio.
113,712.—WASH-BOILER.—William A. Wells, St. Paul, Minn., and Lyman P. Converse, Milwaukee, Wis.
113,713.—MEDICAL COMPOUND OR BITTERS.—Samuel R. Whitlow, Limestone township, Ill.
113,714.—REED-ORGAN.—George W. Woodruff, Hartford, Conn., assignor to John Farris, same place.
113,715.—TRUNK.—John Young, Buffalo, N. Y.
113,716.—SURFACE BLOW-OFF PIPE FOR BOILERS.—James Perkins, Baltimore, Md., assignor to himself and Jacob Brandt, Jr., same place.
113,717.—CORN-PLANTER.—George W. Lewis, Winchester, Ky.
113,718.—COMBINED PLANTER AND SEEDER.—Samuel Hiestand, Hillsborough, Ohio.

IMPORTANT TO INVENTORS.

WESTERN AND CO.'S PATENT AGENCY.

CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

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The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country and presents the very best means of reaching that very important class of men.*

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THE CHALMERS-SPENCE PATENT NON-CONDUCTOR CO.

HEAD OFFICE: MORGAN IRON WORKS, NEW YORK.
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Never deteriorates. Saves 20 per cent. Keeps steam perfectly dry. Thirty of the largest Mississippi boats have their boilers, pipes, etc., covered with this invaluable material. J. CHALMERS,
J. B. ROACH, Manager.
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CUMBERLAND COAL,
MINED BY THE
CONSOLIDATION COAL COMPANY,
Of the best quality for manufacturing, steam generating, and domestic purposes.

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Baltimore and Georgetown Agency,
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Kings County Steam Boiler-Works,
MANUFACTURER OF
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ALSO,
TAYLOR'S PATENT UPRIGHT RETURN TUBULAR BOILERS,
TANKS, GASOMETERS, SUGAR PANS, COOLERS,
OIL-STILLS AND OIL-TANKS.
ALSO,
ANDERSON'S Improved Machine for
GRINDING SEATS OF VALVES.
Nos. 345 and 347 First Street,
(Old Nos. 277 and 279,
Near North-Fourth, (P. O. BOX 213.) Brooklyn, E. D.
J. M. RING, Sole Agent 265 Broadway, New York.
☞ Special attention given to repairs. dec6-6m

UNITED STATES DISTRICT COURT

In the matter of ABRAHAM BININGER and ABRAHAM B. CLARK, Bankrupts.

Notice is hereby given that the undersigned, as Assignee of the above-named bankrupts, will sell at public auction, at the Merchants' Exchange Salesrooms, No. 111 Broadway, in the City of New York, on the 17th day of May, 1871, at 12 o'clock, at noon, by E. H. Ludlow & Co., Auctioneers, two parcels of land adjoining each other, situate partly in Spottsylvania county, Virginia, and partly in Orange county, Virginia, containing together seven hundred and seven acres of land, known as the Vaucluse Gold Mining property, together with the mines, minerals, metals, and metallic substances, buildings, improvements fixtures, and appurtenances thereto belonging, including two steam engines, and all other mining machinery and utensils used in the mining operations now, or recently, carried on at the said Vaucluse mine, etc.

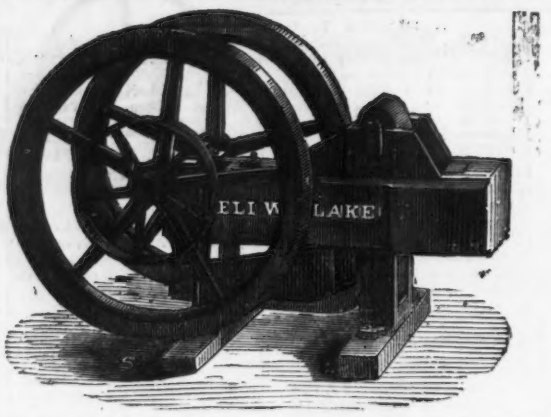
The sale will be subject to confirmation by the Court.

Detailed description of the property, and an inventory of the improvements, fixtures, etc., may be had upon application to the undersigned, or to his attorneys, Messrs. BANGS, SEDGWICK & NORTH, No. 137 Broadway, or to the Auctioneers.

New York, March 16, 1871.
JOHN S. BEECHER, Assignee,
No. 98 Front street,
6:0:w New York City.

MISCELLANEOUS.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

JOHN A. GRISWOLD, ERASTUS CORNING, JR.,
ERASTUS CORNING, CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,
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TROY, N. Y.
Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace
MANUFACTURERS of PIG IRON, RAILROAD, MERCHANT AND SHIP IRON,
Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,
OF ALL DESCRIPTIONS.
Office in New York, No. 56 Broadway.
May 17:1y

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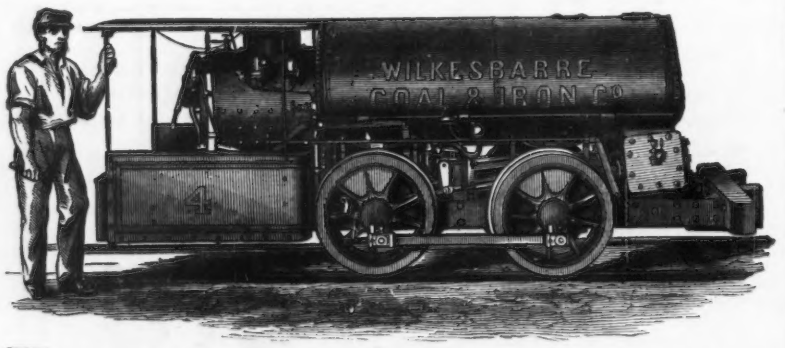
B. S. GIBLIN, Treasurer. GEORGE A. BELL, President
WORKS NEWARK, N. J., OFFICE No. 61 MAIDEN LANE NEW YORK.
Franklinite Pig Iron (Spiegeleisen), Spelter, Oxide of Zinc,
Spiegeleisen Cinder for Blast Furnaces.
May 24:1y

LEHIGH ZINC COMPANY.

GORDON MONGES, Treasurer. B. C. WEBSTER, President.
WORKS, BETHLEHEM, PA. OFFICE, 333 Walnut Street, Philadelphia.
JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.
OXIDE OF ZINC, SPELTER, SHEET ZINC.
Jun28:1y



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Gauge, two feet six inches or upwards; Hight above rail, five feet four inches; Width over all, five feet one inch; Adapted to burn Anthracite or Bituminous coal or coke.

Materials and Workmanship Equal to those in Full Gauge Railroad Locomotives.

Guaranteed to pass curves of twenty-five feet radius and haul on a level track in good condition
Three Hundred and Forty Gross Tons of Cars and Load.
For Photograph and full particulars, address M. BAIRD & CO.,
Feb:7:1y:eow Baldwin Locomotive Works, Philadelphia.

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AND ARE
DRIVEN AND STEERED BY ONE MAN.

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Clausthal, March 15, 1871,

R. P. ROTHWELL,
MINING AND CIVIL ENGINEER
AND METALLURGIST,
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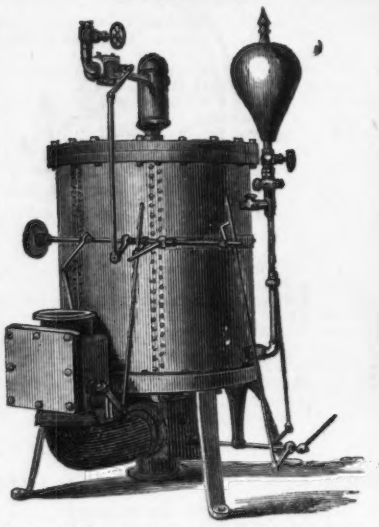

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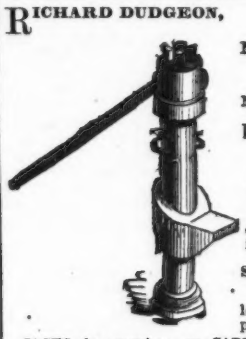

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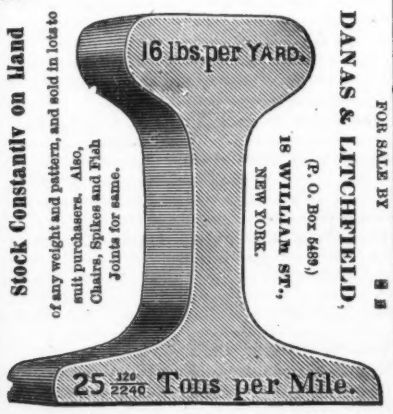

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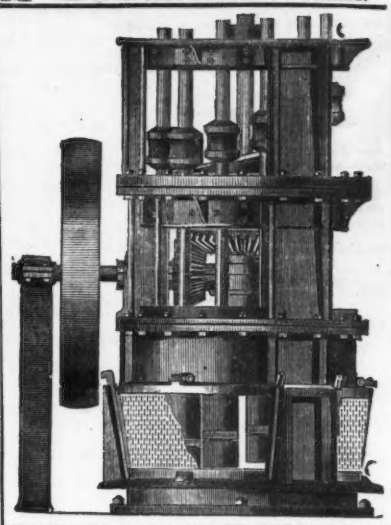

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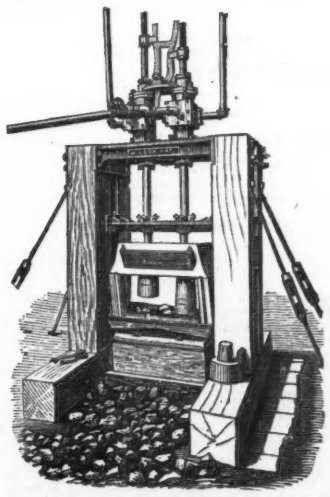

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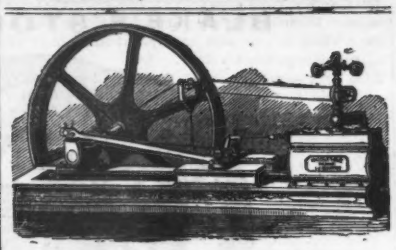

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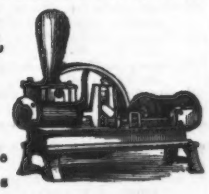

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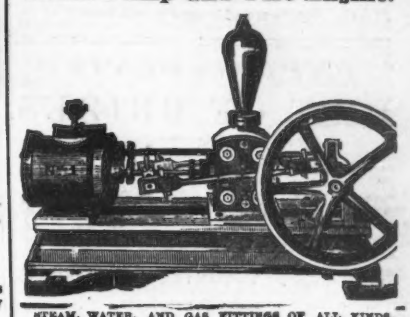

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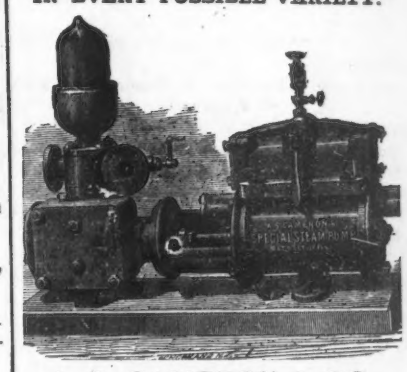

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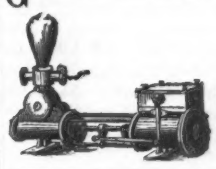

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60	—Screw-Plates and Dies, size D 1	13 00	20	70
61	—Tap-Wrenches, size A	3 00	7	25
62	—Tap-Wrenches, size B	4 00	9	30
63	—Tap-Wrenches, size C	5 00	12	37
64	—Set of 11 Taper Shank-Twist Drills, No. 1	19 75	29	90
65	—Set of 29 Drills, straight shank, mounted, No. 9	12 00	18	60
66	—Set of 60 Drills, steel wire gauge from 1 to 60, No. 12	8 00	15	45
67	—Set of 21 Taper-Shank Drills, No. 3	44 00	58	175
68	—Set of 9 Bit-Stock Drills, 1-16 to ½ in.	2 80	6	25
69	—Self-Centering Drill-Chucks, Beach's patent, for jewelers, No. 0	10 00	18	58
70	—Self-Centering Drill-Chucks, Beach's patent, for drilling, No. 0	7 00	14	40
71	—Self-Centering Drill-Chucks, Beach's patent, 0 to 3-16, No. 1	6 00	13	38
72	—Self-Centering Drill-Chucks, Beach's patent, 1 to 60 S. W. E., No. IX	7 00	14	40
73	—Self-Centering Drill-Chucks, Beach's patent, 0 to ½, No. 3	14 00	23	77
74	—Drill-Grinding Machine, No. 1	10 00	18	58
75	—Drill-Grinding Machine, No. 2	20 00	30	95
76	—Auger-Bits, your choice of 4 sets	—	—	—
	FROM L. W. POND.			
77	—Foot-Lathe, No. 1	50 00	65	204
78	—Foot-Lathe, No. 2	30 90	47	124
	FROM COLBY BROS. & CO.			
79	—Miniature Steam-Engine and Boiler	1 36	5	23
	FROM RUSSELL & SPEIR.			
80	—Steam-Engine (1 H. P.) and Boiler	300 00	310	1125
81	—Steam-Engine (3 H. P.) and Boiler	600 00	640	3250
82	—Steam-Engine (5 H. P.) and Boiler	800 00	858	3000
83	—Steam-Engine (10 H. P.) and Boiler	1200 00	1285	4500
84	—Steam-Pump, C. B. Hardick's, No. 0	120 00	155	540
85	—Steam-Pump, Cameron & Co.'s, No. 1	150 00	192	675
86	—Steam-Pump, Cameron & Co.'s, No. 2	200 00	257	900
87	—American Submerged Pump	12 00	19	65
	FROM GEORGE TALLCOT.			
88	—Turbine Water-Wheel, Reynold's, 12 in.	105 00	125	360
89	—Turbine Water-Wheel, Reynold's, 24 in.	226 50	270	800
90	—Turbine Water-Wheel, Reynold's, 36 in.	384 50	460	1350
91	—Rotary Blower, Root's patent, No. 1	350 00	70	275
92	—Rotary Blower, Root's patent, No. 2	80 00	105	420
93	—Portable Forge, Root's patent, No. 1	48 00	65	260
94	—Portable Forge, Root's patent, No. 3	80 00	105	420
	FROM THE AMERICAN SAW CO.			
95	—Circular Saw	125 00	135	473
96	—Cross-Cut Saw	6 60	14	42
	FROM A. P. & M. STEPHENS.			
97	—Labor-Saving Vise, 2-in. jaw	4 00	9	32
98	—Labor-Saving Vise, 4½-in. jaw	12 00	28	58
	FROM THE STANLEY RULE & LEVEL CO.			
99	—Boxwood two-foot Rule	2 50	6	25
100	—Silver-Plated Triangular Drawing-Scale	6 00	16	52
101	—Pocket Sheet-Metal Gauge	5 00	13	37
102	—Arkansas Oil-Stone	1 75	5	22
103	—Arkansas Oil-Stone, mahogany case	3 25	8	30
104	—Gear or Cog-Wheel Calculating-Rule	4 00	12	36
	WESTERN & COMPANY'S AGENCY.			
105	—Preparing and Filing a Caveat	25 00	28	80
106	—Application for a Patent	30to40	35	100
107	—Application for Patent and first Government fee	46to56	50	150
108	—Application for Patent and all Government fees	66to76	75	250
	FROM J. W. HUTCHINSON.			
109	—English Breech-loading double-barrel Gun	100 00	110	350
110	—English Muzzle-loading double-barrel Gun	75 00	85	250
111	—Breech-loading Rifle, the Allen	30 00	46	150
112	—Revolver, Smith & Wesson's, No. 1½	12 50	19	65
113	—Revolver, Smith & Wesson's, No. 2	15 00	22	75
	FROM MASON & HAMLIN.			
114	—Melodeon, portable, No. 1, 4 octave	50 00	66	200
115	—Melodeon, resonant, style G, 5 octave	170 00	146	510
116	—Pipe-Organ, church use, style No. 29	675 00	579	2000
	FROM J. S. & C. ODELL.			
117	—Pipe-Organ	500 00	430	1500
118	—Pipe-Organ	700 00	600	2100
119	—Bradbury Square Piano-Forte, No. 4	650 00	430	1500
120	—Steinway's No. 1 Grand Piano	1200 00	860	3000
	THE AMERICAN WATCH CO., WALTHAM, MASS.			
121	—Silver Watch	20 00	32	100
122	—Silver Watch	35 50	48	142
123	—Gold Watch	50 00	65	200
124	—Lady's Gold Watch	100 00	110	350
	FROM THE UNITED STATES WATCH CO.			
125	—Silver Watch	40 00	50	150
126	—Silver Watch	66 00	75	275
127	—Gold Watch	100 00	100	300
128	—Silver Watch	104 00	104	312
129	—A Sewing Machine (your choice)	65 00	65	200
	FROM MCALLISTER.			
130	—Microscope and 48 objects	10 00	14	40
	FROM COLBY BROS. & CO.			
131	—Velocipede for Boys	16 00	16	52
	FROM MCALLISTER.			
132	—Magic-Lantern, No. 433	20 00	30	95
	FROM H. THOMPSON.			
133	—An Easy Chair			
	FROM D. APPLETON & CO.			
134	—New American Cyclopædia, 16 vols.	80 00	80	213
	FROM G. & C. MERRIAM.			
135	—Webster's Unabridged Pictorial Dictionary	12 00	15	45
136	—Webster's National Pictorial Dictionary	6 00	10	35
	FROM WESTERN & COMPANY.			
137	—One back vol. Manufacturer and Builder, unbound, post-paid	1 75	6	25
138	—Two back volumes Manufacturer and Builder, unbound, post-paid	3 50	11	37
139	—One back vol. Manufacturer and Builder, bound, post-paid	2 50	9	32
140	—Two back volumes Manufacturer and Builder, bound, post-paid	5 00	18	58
141	—Cover for binding the Manufacturer and Builder, post-paid	60	3	21
142	—A $10 Library (your choice from list in special sheet),	10 00	18	58
143	—A $15 Library, "	15 00	24	85
144	—A $20 Library, "	20 00	31	106
145	—A $25 Library, "	25 00	38	125
146	—A $30 Library, "	30 00	44	144
147	—A $35 Library, "	35 00	50	162
148	—A $40 Library, "	40 00	56	177
149	—A $45 Library, "	45 00	62	192
150	—A $50 Library, "	50 00	68	207
151	—A $60 Library, "	60 00	80	237
152	—A $75 Library, "	75 00	100	282
153	—A $100 Library, "	100 00	125	360

All paid through by mail or express.

154	—A choice of good Books (see terms in another column)			
155	—A choice of convenient Book-Cases (see special sheet)			
156	—A choice of popular Music (see terms in special sheet)			
157	—A choice of Games and Toys, (see terms in special sheet)			

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **78** **99, 101, 105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154, 156, 157,** will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $3; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 33c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ⅜ in., 32c.; ½ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ½ in., 21c.; ¾ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do,, 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c.; ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel, ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;—**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rose-wood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for th boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured, The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120, at $1, we will send the table size, sold at $25. No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs, HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two tea-pots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 33, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3½ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury. No. 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HENRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ¼ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45.53—Bailey's Patent Planes.—To those who have used these planes and know their value, it is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer give carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5½ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane.. .....14 in. long, 2 in. cutter.
Fore " .....18 " " 2¾ " " } Iron.
Jointer " .....22 " " 2¾ " "

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $.50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operrtions to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, two rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmanship, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-whee is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expressly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into the steam-space, to save room and heat. The one-horse engine and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6¼ feet high by 3 feet in diameter, costs $800, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, corn-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incumbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4½ by 7 inches, and its capacity of ordinary speed is 15 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair,

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 108—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co., 495** Broadway, New York; **Florence Sewing Machine Co., 505** Broadway, New York; **Wilcox & Gibbs Sewing Machine Co., 658** Broadway, New York; **Singer Sewing Machine Co., 458** Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of numbers for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural device stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *post-paid*, on receipt of three subscribers at $1,50 for each cover.

Nos. 142 to 154—Good Libraries.—In these premiums we offer a choice of books for manufacturers, mechanics, artisans, builders and others. The person entitled to any one of the premiums 142 to 153, may select any books desired from the list published in our Special Premium Sheet, to the amount of the premiums, and the books will be forwarded, post or express paid. $25 or $50 worth of books pertaining to the industrial arts will give the boys new ideas, set them to thinking and observing, and thus enable them to make their heads help their hands. Any good book will, in the end, be of far more value to a youth than to have an extra hundred dollars on coming to manhood. ☞ Let the mechanics of a neighborhood unite their efforts, and through these premiums get an industrial library for general use.

No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

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will be furnished free of charge in sufficient quantities to meet the reasonable requirements of agents. We would respectfully request that they do not waste them, but distribute them judiciously. If some unexpected event should prevent them from continuing in the business, they will do the square thing by us by giving their outfit to some friend, who will continue the business where they have left off; and who will no doubt be grateful for the opportunity of receiving profitable employment.

Postage.

Every subscriber pays his own postage at the office where he receives the paper. This is only twenty-four cents per year, or six cents per quarter, payable in advance.

Don't Give up Your Town

until everybody has been supplied with a circular and has had a chance to subscribe; and be sure that you leave your address, so that they may know where to find you in case they should make up their minds to take the magazine after you have left them. Make all drafts, money-orders, and registered letters payable to the order of Western & Company, publishers, and address all communications

WESTERN & COMPANY, Publishers,
NO. 37 PARK ROW, NEW YORK.

TABLE OF CASH PREMIUMS For 1871.

EVERY MAN HIS OWN PAY-MASTER. STEADY EMPLOYMENT AND GOOD PAY.	PREMIUMS. At $1 50 each.	PREMIUMS. At $1 00 each
For every club of 4 subscribers.....	$1 00	
" " " 10 "	3 00	
" " " 15 "	6 00	
" " " 20 "	10 00	
" " " 30 "	16 50	$1 50
" " " 40 "	24 00	4 00
" " " 50 "	32 50	7 50
" " " 75 "	48 75	11 25
" " " 100 "	65 00	15 00
" " " 200 "	140 00	40 0
" " " 500 "	350 00	100 00
" " " 1000 "	700 00	200 00

INTERMEDIATE CLUBS.

It often happens that clubs are made up of numbers that are not found in the above table. Names may be added to clubs at the following rates:

In clubs of	4	and less than	10..	$1 25	for each name.			
" "	10	" "	15..	1 20	" "			
" "	15	" "	20..	1 10	" "			
" "	20	" "	30..	1 00	" "			
" "	30	" "	40..	95	" "			
" "	40	" "	50..	90	" "			
" "	50	" "	200..	85	" "			
" "	200	" "	500..	80	" "			
" "	500	" "	1000..	80	" "			
" "	1000	and over.....		80	" "			

The Profits of the Cash Business, it will be seen by the above tables, are large and accrue rapidly. Every experienced canvasser knows that it is far easier to obtain 4 subscribers to a paper like THE MANUFACTURER AND BUILDER at $1 50 each than to get 1 subscriber to a high-priced magazine, costing $6. This is more strikingly evident when the fact is taken into consideration that our paper, costing only $1 50, is ACTUALLY SUPERIOR IN EVERY RESPECT TO ANY THING OF THE KIND IN THE COUNTRY COSTING TWICE THAT SUM.

There is another point in favor of our Magazine, as compared with a higher-priced periodical. This is the well-known fact, that in a manufacturing establishment, or even in a town, the working-men will rarely look at a paper costing $3 or $6, and the result is that only rich persons, comparatively, and proprietors can be solicited with any success. Now, these persons are scarce in any community; and a paper that comes within the means and comprehension of the masses or majority of the people, of course commands an immensely wide field. Hence, instead of getting only the proprietor of a manufactory, or the rich men of a town, the working-men can be approached with success; and out of a single establishment as many as 100 subscribers have easily been obtained. This is a very important point to canvassers, and where the large profits with but little effort come in. Try it.

Make all drafts, money orders, and registered letters payable to the order of WESTERN & COMPANY, Publishers, and address all communications,

WESTERN & CO., Publishers,
"The Manufacturer and Builder,"
37 Park Row, New York

NEW LOAN

OF THE

UNITED STATES.

IMPORTANT CIRCULAR.

SUBSCRIPTIONS NOW OPEN—CERTIFICATES READY.

TREASURY DEPARTMENT, WASHINGTON, February 28, 1871.

Public notice is hereby given that books will be opened on the 6th day of March next, in this country and in Europe, for subscriptions to the National Loan, under the act approved July 14, 1870, entitled "An Act to Authorize the Refunding of the National Debt," and the act in amendment thereof, approved January 20, 1871.

The proposed loan comprises three classes of bonds, namely:

FIRST. Bonds to the amount of five hundred millions of dollars, payable in coin, and bearing interest payable quarterly in coin, at the rate of five per cent. per annum.

SECOND. Bonds to the amount of three hundred millions of dollars, payable in coin, at the pleasure of the United States, after fifteen years from the date of their issue, and bearing interest, payable quarterly in coin, at the rate of five per cent per annum.

THIRD. Bonds to the amount of seven hundred millions of dollars, payable in coin, at the pleasure of the United States, after thirty years from the date of their issue, and bearing interest, payable quarterly in coin, at the rate of four per cent. per annum.

Subscriptions to the loan will have preference in the following order, namely:

FIRST. Subscriptions that may be first made for five per cent. bonds to the amount of two hundred millions of dollars; of which there will be reserved, for twenty days, one-half for subscribers in this country, and one-half for subscribers in foreign countries.

SECOND. Subscriptions for equal amounts of each class of bonds.

THIRD. Subscriptions for equal amounts of bonds bearing interest at the rate of four and a half per cent., and of bonds bearing interest at the rate of five per cent.

FOURTH. Subscriptions for any five per cent. bonds that may not be subscribed for in the preceding classes.

When a subscription is made, the subscriber will be required to deposit two per cent. of the amount thereof in coin or currency of the United States, or in bonds of the class to be exchanged, or to be accounted for by the Government when the new bonds are delivered; and payment may be made either in coin or in bonds of the United States, known as FIVE-TWENTY BONDS, at their par value.

The coin received in payment will be applied to the redemption of five-twenty bonds, and the debt of the United States will not be increased by this loan.

The bonds will be registered or issued with coupons, as may be desired by subscribers. Registered bonds will be issued of the denominations of $50, $100, $500, $1,000, $5,000, and $10,000; and coupon bonds of each denomination except the last two. The interest will be payable in the United States at the office of the Treasurer, and Assistant Treasurer, or Designated Depository of the Government, quarterly, on the first days of February, May, August, and November, in each year.

The bonds of the several classes aforesaid, and the interest thereon, are exempt from the payment of all taxes or dues of the United States, as well as from taxation in any form by or under State, municipal or local authority.

After maturity, the bonds last issued will be first redeemed, by classes and numbers, as may be designated by the Secretary of the Treasury.

The bonds will be issued at the United States Treasury, but the agents for the negotiation of the loan in Europe are authorized to make arrangements with subscribers for the transmission of the bonds to the agents through whom subscriptions may be received.

Subscribers in the United States will receive the new bonds of the agents with whom the subscriptions are made.

In the United States the National Banks are authorized to receive subscriptions, and subscriptions may also be made at the office of the Treasurer of the United States, or of any Assistant Treasurer, or the Designated Depositaries at Buffalo, N. Y.; Chicago, Ill.; Cincinnati, Ohio; Louisville, Ky.; Mobile, Ala.; and Pittsburgh, Penn.

P. S.—This Department and its own Loan Agents are now ready to receive the United States Five-Twenty Bonds and to pay the gold interest thereon to May 1, from which date the new bonds will bear interest. A script certificate, calling for the bonds on the 1st of May, will be issued at once in exchange for the old bonds.

GEORGE S. BOUTWELL,
SECRETARY OF TREASURY.

Progress of Reduction of Public Debt of United States.

	Maximum War Debt, July 31, '65.	Debt at close of last Adm'n., March 1, '69.	Present Outstanding Debt, April 1, 1871.
Five-twenty six per cent stock	$606,569,500	$1,604,587,350	$1,416,088,850
Other six per cent stocks	302,301,042	283,677,400	283,678,100
Ten-forty five per cent stock	172,770,100	194,567,300	194,567,300
Other five per cent. stock	27,022,000	27,022,000	20,000,000
Three-year 7-30 per cent. notes	830,000,000	.....	.....
Three-year six per cent. notes	212,121,470	.....	.....
Total funded	$2,150,784,112	$2,107,854,050	$1,914,344,250
Greenback notes	$473,114,799	$356,021,073	$356,098,621
Greenback certificates	205,822,845	71,140,000	53,493,006
Gold certificates	.....	28,775,560	25,261,460
Fractional currency	25,750,032	36,781,547	40,340,445
Past-due notes and bonds	17,263,120	6,424,464	3,164,502
Total Treasury circulation	$721,950,796	$499,140,644	$478,356,028
Less gold in Treasury	35,337,858	98,741,261	105,697,800
	$686,612,938	$400,399,383	$372,658,228
Less currency balance	81,401,775	16,853,529	18,686,247
Net Treasury circulation	$605,211,163	$383,545,854	$353,971,981
Total principal of debt	$2,755,995,275	$2,491,399,904	$2,268,316,231
Yearly interest, in gold	$64,419,628	$124,255,350	$112,714,982
Yearly interest, in currency	87,412,423	2,134,200	1,621,570
Total amount of interest charge	$151,832,051	$126,389,550	$114,336,552

The results of the above exhibit are as follows:

Principal of debt, 1865	$2,755,995,275
Paid under Johnson	264,595,371
Principal, March 4, 1869	$2,491,399,904
Paid under Grant	223,083,673
Present public debt	$2,268,316,231
Interest charge, 1865	151,832,051
Reduced in four years by payment and funding	25,442,501
Interest charge, 1869	$126,389,550
Reduced in two years by payment	12,052,998
Present interest charge	$114,336,552

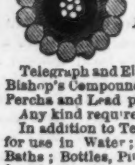
The proposed further reduction of the annual interest charge upon the public debt by the funding are as follows:

By exchange of $500,000,000 U. S. 6 per cents. for new five per cents. of 1881	$5,000,000
By exchange of $300,000,000 U. S. 6 per cents. for 4½ per cents. of 1886	4,500,000
By exchange of $700,000,000 U. S. 6 per cents. for 4 per cents. of 1901	14,000,000
Total saving per annum by refunding	$23,500,000

C. C. NORVELL,
In Charge Advertising United States Loans.

TREASURER'S OFFICE, New York, April 15.

THE BISHOP GUTTA-PERCHA WORKS,
422, 424 & 426 East 25th St., Office at Factory, New York.
SAMUEL C. BISHOP, Proprietor,



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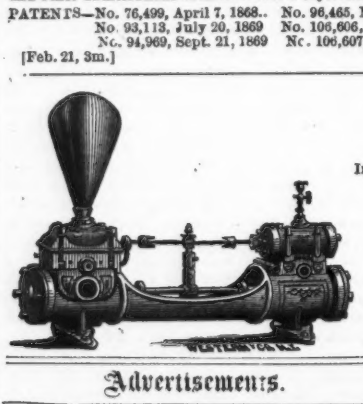
SUBMARINE TELEGRAPH CABLES.

Submarine Wires, insulated for Mining and Blasting use.
Telegraph and Electric Wires for office and other uses, of all sizes; Cotton and Silk Covered Wires, of all sizes; Bishop's Compound Cordage for air lines and outside connections; Underground Wires, covered with Gutta-Percha and Lead protection; Underground Wires, with fibre and Bishop's Compounds.
Any kind required made to order.
In addition to Telegraph and Electric Goods, I make all kinds of Pure Gutta-Percha goods, such as Belting for use in Water; Sheet for Surgical use; Sheet for various Mechanical uses; Lining for Acid and Chemical Baths; Bottles, Pitchers, and Funnels for Acids; Tissue Sheets for Caps and Hats; Soda and Beer Pipe; Boxes for Flax Machinery, etc., etc.
N. B.—TILLOTSON & CO., 8 Dey street, New York, and BLISS, TILLOTSON & CO., 247 South Water street, Chicago, are General Agents for the sale of any Telegraph and Electric Goods made by me, at Factory prices.
JOHN THORNLEY, 503 Chestnut street, Philadelphia, Pa., is Agent for the sale of any goods made by me at Factory prices.
☞ Orders also received at Factory for all kinds made.
Any goods of my manufacture, "excepting Telegraph and Electric Goods," are for sale in New York, by H. G. NORTON & CO., 26 Park Place; RUBBER CLOTHING Co., 347 Broadway; D. HODGMAN, 27 Maiden Lane, New York.
sep13:4m

CHARLES A. BROWNE & BROTHER,
NORTH ADAMS, MASS.
MANUFACTURERS
OF
PATENT ELECTRIC FUSE, &c.—ALL THE ELECTRIC FUSES USED UPON THE HOOSAC TUNNEL.
FOR
EXPLODING NITRO-GLYCERINE, DUALIN AND POWDER,
Are manufactured by us. Send for circular.

HOOSAC TUNNEL NITRO-GLYCERINE WORKS.
Tri-Nitro-Glycerice, Electric Fuse Exploders, Pure Gutta Percha Insulated Wire.

The Tri-Nitro-Glycerine manufactured under the Mowbray Patents is safer to handle, has 30 per cent. more plosive force, and is a more stable compound, than can be made by the Nobel Process. Our fuses are safe to handle and are sure fire. We purify our own Gum Gutta Percha, and insulate copper wire with machinery (the result of many years' investigation), with the sole view to render blasting with Nitro-Glycerine perfectly safe and 50 per cent. cheaper than with powder. Proved to have double the force in blasting over Dualin, Dynamite, and other adulterations of inferior Nitro-Glycerine with inert matter.
PATENTS—No. 76,499, April 7, 1868.. No. 96,465, Nov. 2, 1869.
No. 93,113, July 20, 1869 No. 106,606, Aug. 23, 1870. Address GEORGE N. MOWBRAY,
No. 94,969, Sept. 21, 1869 No. 106,607, Aug. 23, 1870. NORTH ADAMS, MASS.
[Feb. 21, 3m.]



KNOWLES'
PATENT
STEAM PUMPS,
In every variety, for MINES, RAILROADS, STEAMSHIPS and MANUFACTURING USES.
MINING PUMPS A SPECIALTY.
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Warehouse, 90 and 92 Liberty street, New York.
Works at Warren, Mass.
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Advertisements.

Advertisements admitted on this page at the rate of 40 cents per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

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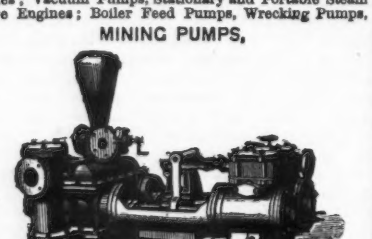
BROOKLYN, N. Y.
Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,
MINING PUMPS,



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☞ Send for Circular.
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POWDER CO., 21 Park Row, opposite Astor House, New York,
invite attention to their facilities for delivering
BLASTING POWDER,
SAFETY FUSE,
ELECTRICAL BLASTING
APPARATUS, &c.,
wherever required, from having nine manufactories in different States, beside agencies and magazines at all distributing points. nov. 1:1y

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PATENT
DUALIN.
NEW EXPLOSIVE,
EQUAL IN STRENGTH TO NITRO-GLYCERINE.
SAFER THAN GUN-POWDER.
Factory and Office, Neponset, Mass.
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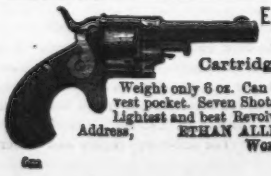

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NEW MODEL
Cartridge Revolver.
Weight only 6 oz. Can be carried in the vest pocket. Seven Shots, 22-100 calibre. Lightest and best Revolver in the world.
Address, ETHAN ALLEN & CO.
6m WORCESTER, Mass.

MOUNT SAVAGE FIRE BRICK
GOVERNMENT STANDARD.
Manufactured by the
Mount Savage Fire Brick and Mining Company.
This Company having acquired the Fire Clay properties and Brick Works of the
Consolidation Coal Company,
will receive orders for their unequalled FIRE BRICK for Blast, Puddling, Smelting and Glass furnaces. Diagrams of shapes and prices will be furnished on application to
J. S. MACKIE, Pres., 71 Broadway, New York. Room 44.
JAMES A. MILLHOLLAND, Vice Pres.,
Dec. 7.tf Mount Savage, Maryland.

THE BEST TURBINE WHEEL.
SWAIN'S
Gave 5 Per Cent. better results at the Lowell Test than any of its Highly Polished Competitors.
It will give from 30 to 100 per cent. more power in proportion to its size, than any other wheel.
Guaranteed to give from 10 to 50 per cent. more power, with the same water, than any other wheel in the market
It is the best made, most compact, runs longer without repairs, and gives better satisfaction than any other wheel.
☞ Send for report of tests, with description nd diagrams.
SWAIN TURBINE CO.,
Dec 6:6m North Chelmsford, Mass.

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Vulcanized Rubber Fabrics,
Adapted to Mechanical Purposes,
nvite the attention of all who are interested in the sale or use of such articles to the high standard quality and w prices of their various manufactures, comprising
chine Belting, Steam Packing, Leading Hose, Suction Hose, Car Springs, Wagon Springs, Billiard Cushions, Grain Drill Tubes,
etc., etc., etc.,
"TEST" HOSE
made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments requiring new hose, will find this much superior in strength and quality to any other.
PATENT SOLID EMERY VULCANITE WHEELS, a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.
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☞ Price lists and further information may be obtained by mail or otherwise on application.
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